Appendix C
Regulatory Impact Review/Initial Regulatory Flexibility Analysis

Prepared by

Tetra Tech FW, Inc.
Natural Resources Consultants (NRC)
EDAW, Inc.
National Marine Fisheries Service

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CONTENTS

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

ADF&G	Alaska Department of Fish and Game
AED	Alaska Enforcement Division
AFA	American Fisheries Act
BSAI	Bering Sea and Aleutian Islands Area
CDQ	community development quotas
CG	Central Gulf of Alaska
Council	North Pacific Fishery Management Council
CPUE	catch-per-unit-effort
CVM	contingent value' method
EA	Environmental assessment
EBS	Eastern Bering Sea (that portion of the Bering Sea within the United States EEZ)
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EG	Eastern Gulf of Alaska
EIS	Environmental impact statement
EO	Executive Order
EPIRB	Emergency Position Indicating Radio Beacon
ESA	Endangered Species Act
FMP	Fishery management plan
GHL	guideline harvest limit
GHR	guideline harvest range
GOA	Gulf of Alaska
H&G	headed and gutted
HAPCs	habitat areas of particular concern
IPHC	International Halibut Commission
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
NEPA	National environmental policy act
NIOSH	National Institute of Occupational Safety and Health
NMFS	National Marine Fisheries Service
NPT	non-pelagic trawl
OY	optimum yield
PTR	pelagic trawl gear
Regional Councils	Regional Fishery Management Councils
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAR	search and rescue
Secretary	Secretary of Commerce
SVD	single vessel database
TAC	total allowable catch
VMS	vessel monitoring systems
WG	Western Gulf of Alaska

An Analytical Clarification

A benefit/cost framework is the appropriate way to evaluate the relative economic and socioeconomic merits of the alternatives under consideration in this RIR. When performing a benefit/cost analysis, the principal objective is to derive informed conclusions about probable net effects of each alternative under consideration (e.g., net revenue impacts). However, in the present case, necessary empirical data (e.g., operating costs, capital investment, debt service, opportunity costs) are not available to the analysts, making a quantitative net benefit analysis impossible. Furthermore, empirical studies bearing on other important aspects of these alternative actions (e.g., passive-use values, domestic and international seafood demand) are also unavailable, and time and resource constraints prevent their preparation for use in this analysis.

Nonetheless, the following regulatory impact review, initial regulatory flexibility analysis, and supporting text use the best available information and quantitative data, combined with accepted economic theory and practice, to provide the fullest possible assessment (both quantitative and qualitative) of the potential economic benefits and presumptive costs attributable to each alternative action. Based upon this analysis, conclusions are offered concerning the likely economic and socioeconomic effects that may derive from each of the alternatives. This analytical approach is consistent with applicable policy and established practice for implementing Executive Order (EO) 12866.

As noted, one would ideally wish to derive empirically based net economic impact estimates. For the reasons cited, this is not presently possible. Therefore, this comparative analysis is, by default, predicated on gross level effects. The analysts do not assert that gross and net measures are effective proxies for one another. However, given considerable empirical experience with these fisheries, anecdotal information from well informed sources, and accepted economic theory, gross effects (e.g., gross revenues-at-risk) can provide useful insights into the probable relative impacts of the alternative actions under consideration, in the absence of net impact measures.

Furthermore, to paraphrase EO 12866, "... costs and benefits are, herein, understood to include, and have been assessed on the basis of, both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider." The EO continues: "... in choosing among alternative regulatory approaches, agencies should select... (presumably, based upon the combined interpretation of the quantitative and qualitative measures explicitly provided for in the preceding sentence from the EO)...those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity)... ."

NOAA Fisheries' *Guidelines for Economic Analysis of Fishery Management Actions* (as revised August 16, 2000) states, "Economists may use several analytical options to meet the spirit and requirements of EO 12866, the RFA, and other applicable laws. The appropriate options depend on the circumstances to be analyzed, available data, the accumulated knowledge of the fishery and of other potentially affected entities, and on the nature of the regulatory action."

Elsewhere, the guidelines state, "... the analyst is expected to make a reasonable effort to organize the relevant information and supporting analyses, (but)... at a minimum, the RIR and RFAA should include a good qualitative discussion of the economic effects of the selected alternatives. Quantification of these effects is desirable, but the analyst needs to weigh such quantification against the significance of the issue and available studies and resources. Generally, a good qualitative discussion of the expected effects would be better than poor quantitative analyses." This RIR/IRFA has been prepared consistent with these prescriptions.

For clarity of presentation, a simple analytical convention is adopted for the gross revenue-at-risk assessment (presented below), in which the 2001 fisheries are reexamined, in succession, as if each of the proposed EFH fishery impact minimization alternatives had been in place in that year. This convention is adopted, in large part, to reduce the inherent risk of introducing parameter bias, associated with the analysts speculating on, for example, future catch distributions, species catch composition, ex-vessel and first wholesale prices, and costs, etc. By using this technique, the analysis can be performed using official, empirically observed and recorded, catch and value data sets. The 2001 records are used because they represent the most recent complete data sets for the fisheries in question.

The analysis of the suite of EFH fishery impact minimization alternatives presented in this appendix, is explicitly framed within the prevailing open-access management context. As such, the implications of each proposed alternative have been interpreted within the (now familiar) limits of the Olympic or derby fishing system. Within the RIR, open-access management is acknowledged to impose unavoidable inefficiencies upon participants, inducing economic and operational behavior which would not, voluntarily, be observed, were the fisheries rationalized. Open access inefficiencies potentially result in excess capacity, increased economic and physical risk taking, a dissipation of resource rents, and greater potential economic vulnerability and instability in the effected sectors. Except in the few instances when economic rationalization has occurred (e.g., halibut and sablefish IFQs, AFA fisheries) the analysis that follows reflects the implications of the continuing race for fish, which prevails in most of the GOA, EBS, and AI commercial fisheries.

C.1 INTRODUCTION

The federal groundfish, crab, salmon, and scallop fisheries conducted off Alaska in the 3- to 200-nautical mile United States Exclusive Economic Zone (EEZ) are managed under the Fishery Management Plan (FMP) for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area (BSAI), the FMP for the Groundfish of the Gulf of Alaska (GOA), the FMP for the King and Tanner Crab Fisheries in the BSAI, the FMP for Scallop Fisheries Off Alaska, and the FMP for Salmon off Alaska. These FMPs and their amendments are developed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The purpose of the FMPs is to manage the fisheries for optimum yield (OY) and to allocate harvest among user groups.

Amendments to the Magnuson-Stevens Act in 1996 set forth new mandates for the National Marine Fisheries Service (NMFS) and Regional Fishery Management Councils (Regional Councils) to identify and protect important marine and anadromous fish habitat. The Regional Councils, with assistance from NMFS, were required to delineate essential fish habitat (EFH) for all managed species. EFH is defined in the Magnuson-Stevens Act as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

In response to the amended Magnuson-Stevens Act and based on guidelines for the EFH contents of FMPs (50 CFR part 600 subpart J), the North Pacific Fishery Management Council (Council) completed preparation of the following five EFH FMP amendments in 1998:

- Amendment 55 to the Fishery Management Plan for the Groundfish Fishery of the BSAI
- Amendment 55 to the FMP for Groundfish of the GOA
- Amendment 8 to the FMP for the King and Tanner Crab Fisheries in the BSAI

- Amendment 5 to the FMP for Scallop Fisheries Off Alaska
- Amendment 5 to the FMP for the Salmon Fisheries in the EEZ Off the Coast of Alaska (Amendments 55/55/8/5/5)

These EFH FMP amendments were reviewed, approved by the Secretary of Commerce, and took effect on January 20, 1999 (64 FR 20216).

In June 1999, there was a federal court challenge of the scope and substance of the environmental assessment (EA) prepared for Amendments 55/55/8/5/5 (American Oceans Campaign et al. v. Daley, Civ. No. 99-982(D.D.C.)). On September 14, 2000, the U.S. District Court issued an opinion finding the EA insufficient in scope and analytical substance and requiring NMFS to prepare an analysis that would be legally sufficient under NEPA. Therefore, NMFS is reevaluating the EFH components originally developed as part of Amendments 55/55/8/5/5.

The proposed action to be addressed in this supplemental Environmental Impact Statement (EIS) is the development of the mandatory EFH provisions of the affected FMPs as described in section 303(a)(7) of the Magnuson-Stevens Act and based on the guidance in 50 CFR part 600 subpart J. The three-part purpose of this action is to analyze a range of potential alternatives within each fishery to 1) identify and describe EFH for managed species, 2) identify other actions to encourage the conservation and enhancement of EFH, and 3) minimize to the extent practicable adverse effects of fishing on EFH. The scope of the new EIS covers all the required EFH components of the FMPs, as well as the description of a process to identify HAPCs.

This Regulatory Impact Review (RIR) evaluates, to the extent practicable, the economic and socioeconomic impacts of the proposed alternative measures that have been identified to minimize adverse effects of fishing on EFH. A detailed discussion of the environmental and management context for this action is contained in the EIS, which precedes this RIR. The economic and socioeconomic context of this action is presented in the following sections.

C.1.1 Statutory Authority

Under the Magnuson-Stevens Act, the United States has exclusive fishery management authority over all marine fishery resources found within the EEZ, which extends between 3 and 200 nautical miles from the baseline used to measure the territorial sea. The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in the Regional Councils. In the Alaska Region, the Council has the responsibility for preparing FMPs for the marine fisheries it finds that require conservation and management and for submitting their recommendations to the Secretary. Upon approval by the Secretary, NMFS is charged with carrying out the federal mandates of the Department of Commerce with regard to marine and anadromous fish. The groundfish fisheries in the EEZ off Alaska are managed under the FMP for the Groundfish Fisheries of the GOA and the FMP for the Groundfish Fisheries of the BSAI. The crab fisheries in the EEZ off Alaska are managed under the FMP for the Crab Fisheries of the BSAI. The scallop fisheries in the EEZ off Alaska are managed under the FMP for the Scallop Fisheries of Alaska. The salmon fisheries in the EEZ off Alaska are managed under the FMP for the Salmon Fisheries of Alaska. Actions taken to amend FMPs or implement other regulations governing these fisheries must meet the requirements of federal laws and regulations. In addition to the Magnuson-Stevens Act, the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), EO (EO 12866), the Regulatory Flexibility Act (RFA), and the American Fisheries Act (AFA).

While the EFH requirements of the Magnuson-Stevens Act convey no legal authority to the Council and/or NMFS to take similar actions in State of Alaska waters, several of the fishing impact minimization alternatives under consideration would involve fishing closures and other restrictions in state waters. The economic and socioeconomic analyses conducted in this RIR assume that the State of Alaska will adopt the measures in these fishing impact minimization alternatives within its waters, where necessary and appropriate.

C.1.2 Regulatory Impact Review Requirements

This RIR provides the analysis required under EO 12866. The following statement from the EO summarizes the requirements of an RIR:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environment, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

EO 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be significant. A significant regulatory action is one that is likely to achieve the following:

1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities.
2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency.
3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof.
4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this EO.

C.1.3 Purpose and Need

NMFS determined that an EIS was the appropriate NEPA analysis document for the proposed federal action being considered. The determination was based both on the fact that significant impacts may result from implementation of the action and that the action is controversial. The document is a supplemental EIS (rather than an EIS) because it is supplemental to prior EISs that were prepared for the BSAI and GOA groundfish FMPs in 1981 and 1979, respectively. The scoping process used to identify analytical issues and alternatives to meet the identified purpose and need is documented in Appendix A of the EIS.

The actions considered in the EIS are needed to meet the EFH requirements of the Magnuson-Stevens Act section 303(a)(7) and the regulatory guidelines developed by NMFS in accordance with section 305(b)(1)(A). The Magnuson-Stevens Act requires amending FMPs to identify and describe EFH for each of the managed species and their life stages. In December 2002, the Council adopted a draft problem statement to guide the analysis.

The actions are designed to strengthen the ability of NMFS and the Council to protect and conserve habitat of finfish, mollusks, and crustaceans. An important theme within the 1996 reauthorization of the Magnuson-Stevens Act is sustainable and risk-averse management of fisheries; it emphasizes the importance of habitat protection to healthy fisheries. Congress recognized that the greatest long-term threat to the viability of commercial, subsistence, and recreational fisheries is the continued loss of marine, estuarine, and other aquatic habitats.

The primary purpose of the proposed action, covered in this RIR, is the modification of the BSAI and GOA federally managed fisheries to minimize, to the extent practicable, adverse effects on EFH caused by fishing. If more than one alternative accomplishes the primary purpose of this action, a secondary objective is to modify the fisheries such that the actions taken also minimize the adverse economic and social impacts imposed on the commercial fishing industry and associated communities.

C.1.4 EFH Alternatives

The EIS includes analyses of six alternatives for the description and identification of EFH, five alternatives for the identification of habitat areas of particular concern (HAPCs), and six alternatives for the minimization of adverse effects on EFH caused by fishing (fishing impact minimization alternatives). Any of the EFH description alternatives would trigger the need for consideration of measures to minimize the adverse effects of fishing on EFH; thus, the effects of describing and identifying EFH are reflected in the effects of the alternatives to minimize the adverse effects of fishing on EFH, which are the focus of this RIR. Only the minimization alternatives have regulatory actions associated with their adoption and implementation, due to their potential to have a direct effect on the management of federal FMP fisheries. They are, therefore, the only EFH alternatives analyzed in this RIR. When (and/or if) subsequent regulatory actions are proposed in connection with the suite of EFH description and/or HAPC alternatives, a complete RIR will be prepared on those specific actions. The following is a brief description of each of the six fishing impact minimization alternatives. EIS Chapter 2 contains a complete and detailed treatment of the alternatives, as well as charts showing the affected geographic areas under each fishing impact minimization alternative. Table 1.4-1 shows the total area currently available to the fisheries and the area that would be closed under each alternative.

Alternative 1: Status Quo and No Action—Under this alternative, no additional measures would be taken at this time to minimize the effects of fishing on EFH.

Alternative 2: Gulf Slope Bottom Trawl Closures—This alternative would amend the GOA Groundfish FMP to prohibit the use of bottom trawls to target rockfish in 11 designated areas of the GOA slope (200 to 1,000 meters [m]), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed gear or pelagic trawl gear.

Alternative 3: Upper Slope Bottom Trawl Prohibition for GOA Slope Rockfish—This alternative would amend the GOA Groundfish FMP to prohibit the use of bottom trawl gear for targeting GOA slope rockfish species on all upper slope areas of the GOA (200 to 1,000 m), but would allow vessels endorsed for trawl gear to fish for slope rockfish with fixed gear or pelagic trawl gear.

Alternative 4: Bottom Trawl Closures in All Management Areas—This alternative would amend the GOA and the BSAI Groundfish FMPs to prohibit the use of bottom trawl gear in designated areas of the

EBS, AI, and GOA. In the EBS only, bottom trawl gear used in the remaining open areas would have to have disks/bobbins on trawl sweeps and footropes. Area-specific measures are detailed below.

Gulf of Alaska: This alternative would prohibit the use of bottom trawl gear for rockfish fisheries in 11 designated sites of the GOA slope (200 to 1,000 m), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed gear or pelagic trawl gear.

Bering Sea: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in the EBS, except within a designated open area. The open area would be designated based upon historic bottom trawl effort. Within the open area, there would be a rotating closure to bottom trawl gear in five areas to the west, north, and northwest of the Pribilof Islands. Closure areas would be designated in Blocks 1, 2, 3, 4, and 6, with 10-year closed periods for 25 percent of each block. After 10 years, the closed portion of each block would re-open and a different 25 percent of each block would close for 10 years, and so on thereafter. After 40 years, all areas within each block would have been subjected to a 10-year closure, and the rotating area closure would start over.

Aleutian Islands: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in designated areas of the AI. Closure areas would be designated in the areas of Stalemate Bank, Bowers Ridge, Seguam Foraging Area, and Semisopochnoi Island.

Alternative 5A: Expanded Bottom Trawl Closures in All Management Areas—This alternative would amend the GOA and BSAI Groundfish FMPs to prohibit the use of bottom trawl gear in designated areas of the EBS, AI, and GOA. In the EBS only, bottom trawl gear used in the remaining open areas would have to have disks/bobbins on trawl sweeps and footropes. Area-specific measures are detailed below.

Gulf of Alaska: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in 10 designated sites of the GOA slope (200 to 1,000 m). Additionally, it would prohibit the use of bottom trawls for targeting slope rockfish on the GOA slope (200 to 1,000 m), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed gear or pelagic trawl gear.

Bering Sea: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in the EBS, except within a designated open area. The open area would be designated based on historic bottom trawl effort. Within the open area, there would be a rotating closure to bottom trawl gear in five areas to the west, north, and northwest of the Pribilof Islands. Closure areas would be designated in Blocks 1, 2, 3, 4, and 6, with 5-year closed periods for 33 1/3 percent of each block. After 5 years, the closed area would re-open, and the next 33 1/3 percent of each block would close for 5 years, and so on thereafter. After 15 years, all areas within each block would have been subject to a 5-year closure, and the rotating area closures would start over. Additionally, bottom trawl gear used in the remaining areas open to trawling in the EBS would have to have disks/bobbins on trawl sweeps and footropes.

Aleutian Islands: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in designated areas of the AI. Closure areas would be designated in the areas of Stalemate Bank, Bowers Ridge, Seguam Foraging Area, Yunaska Island, and Semisopochnoi Island. These closure areas would extend to the northern and southern boundaries of the AI management unit.

Alternative 5B: Expanded Bottom Trawl Closures in All Management Areas with Sponge and Coral Closures in the Aleutian Islands—Alternative 5B would amend the GOA and BSAI Groundfish FMPs to prohibit the use of bottom trawl gear, year-round, in designated areas of the EBS and GOA just like Alternative 5A. Existing closure areas would not be affected by this alternative; they would remain closed. In the AI, a system of open and closed areas would be established to reduce the effects of trawling on corals and sponges. Additionally, for the EBS only, bottom trawl gear used in the remaining areas open to trawling would be required to have disks/bobbins on trawl sweeps and footropes. The management measures established by this alternative would be in addition to existing habitat protection measures (e.g., area closures, gear restrictions, and limitations on fishing effort). Area-specific regulations are detailed below.

Bering Sea: This alternative would prohibit the use of bottom trawl gear for all groundfish fisheries in the EBS, except within a designated open area. The open area would be designated based on historic bottom trawl effort, and no areas currently closed would be open. Within the open area, there would be a rotating closure to bottom trawl gear in five areas to the west, north, and northwest of the Pribilof Islands. Closure areas would be designated in Blocks 1, 2, 3, 4, and 5, with 5-year closed periods for 33.3 percent of each block. After 5 years, the closed area would reopen, and the next 33.3 percent area of each block would close for 5 years, and so on, thereafter. After 15 years, all areas within each block would have been subject to a 5-year closure, and the rotating closure areas would start over. Additionally, bottom trawl gear used in the remaining areas open to trawling in the EBS would be required to have disks/bobbins on trawl sweeps and footropes.

Aleutian Islands: Alternative 5B would include one of three options for the Aleutian Islands, as described below.

Option 1

1. Open areas would be designated where bottom trawling would be allowed in the AI. These areas would be based on areas of higher effort distribution from 1990 through 2001. Bottom trawling would be prohibited in all remaining sections of the AI management area. Pelagic trawls could be used outside of the designated open areas, but only in the off-bottom mode. The boundaries of open areas, as first designated by the data analysis, were converted to latitude/longitude coordinates (and most were adjusted into a rectangle shape) to facilitate enforcement.

2. TAC reductions would be made for individual stocks or species complexes, based on analysis of 1998 to 2002 data (see Appendix H for analysis methodology). This methodology would result in a 10 percent reduction in the BSAI Pacific cod TAC, a 6 percent reduction in the AI Atka mackerel TAC, and a 12 percent reduction in the rockfish TACs. No TAC reduction would be made for pollock, as this species would be harvested with pelagic trawl gear and, thus, would not be subject to closures.

3. Coral/bryozoan and sponge bycatch limits would be imposed to close specific fisheries and areas, if necessary. If a bycatch limit were reached (all species of corals and bryozoans, or all species of sponges) by a fishery within a regulatory area, the regulatory area would be closed to that fishery for the remainder of the fishing year. Closure areas would be based on AI regulatory areas 541, 542, and 543. Fisheries that would be included in this program comprise the trawl fisheries for Pacific cod, Atka mackerel, and rockfish. Bycatch limits would be based on levels of coral/bryozoans and sponges historically taken by these fisheries in these areas (see Appendix H for data analysis methodology). The limits are as follows.

Fishery	541	542	543
Atka mackerel			
sponge	10 mt	20 mt	66 mt
coral/bryozoans	2 mt	3 mt	8 mt
Pacific cod			
sponge	11 mt	22 mt	22 mt
coral/bryozoans	2 mt	1 mt	6 mt
Rockfish			
sponge	13 mt	5 mt	0 mt
coral/bryozoans	1 mt	1 mt	8 mt

4. Additional fishery monitoring measures would be implemented, including a requirement for 100 percent observer coverage and an electronic vessel monitoring system (VMS) on vessels fishing for groundfish in the AI. These measures would require that vessels use specially trained and experienced observers when possible.

5. A comprehensive plan for research and monitoring would be developed in the AI. The plan would include seafloor mapping, benthic research, and habitat impact assessment for all bottom tending gears, annual habitat assessment reports, and experimental fishing permits to identify additional open areas.

Option 2

1. Open areas would be designated where bottom trawling would be allowed in the AI. These areas would be based on the methodology used in Option 1 above, with eight specific modifications, based on data analysis and input from fishermen and Aleutian Islands residents, as recommended by Oceana. The specific modifications would involve the following areas: Buldir Island, Murray Canyon, South Amchitka, Petrel Bank, Gusty Bay, Kanaga Island, Adak South, and Atka Pass. Bottom trawling would be prohibited in all remaining sections of the AI management area. Pelagic trawls could be used outside of the designated open areas, but only in the off-bottom mode.

2. TAC reductions would be made for individual stocks or species complexes, based on analysis of 1998 to 2002 data (see Appendix H for analysis methodology). This methodology would result in a 6 percent reduction in the AI Atka mackerel TAC and a 12 percent reduction in the rockfish TACs. No TAC reduction would be made for Pacific cod or pollock.

3. Coral/bryozoan and sponge bycatch limits would be imposed to close specific fisheries and areas, if necessary, as specified in Option 1 above.

4. Additional fishery monitoring measures would be implemented, as specified in Option 1 above.

5. A comprehensive plan for research and monitoring would be developed in the AI, as specified in Option 1 above.

6. All bottom contact fishing would be prohibited in six coral garden sites, located off Semisopochnoi Island, Bobrof Island, Cape Moffet, Great Sitkin Island, Ulak Island, and Adak Canyon.

Option 3

1. Open areas would be designated where bottom trawling would be allowed in the AI. These areas would be based on the methodology used in Option 1 above, with specific modifications based on data analysis and input from Aleutian Islands trawl fishermen, as recommended by the Groundfish Forum. Bottom trawling would be prohibited in all remaining sections of the AI management area. Pelagic trawls could be used outside of the designated open areas, but only in the off-bottom mode.

2. Additional fishery monitoring measures would be implemented, as specified in Option 1 above.

Gulf of Alaska: Alternative 5B would prohibit the use of bottom trawl gear for all groundfish fisheries in designated sites of the GOA upper to intermediate slope (200 to 1,000 m). Additionally, it would prohibit the use of bottom trawls for targeting GOA slope rockfish on the GOA upper to intermediate slope (200 to 1,000 m), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed or pelagic trawl gear. These areas would be permanent, year-round closures.

Objectives
The overall goal of Alternative 5B is to reduce the effects of fisheries on benthic epifauna, namely corals and sponges, via two specific objectives. The first objective is to prevent the expansion of bottom trawl effort into unfished areas, through the use of designated open areas. The second objective is to allow habitat recovery in a relatively large portion of the AI by eliminating bottom trawling that had occurred with low effort, outside of the designated open areas. Options 1 and 2 have two additional objectives: to control fishing effort (and hence habitat impacts) within the remaining open areas, by setting TACs proportional to the amount traditionally taken from these areas, and to reduce the bycatch of benthic epifauna by 1) establishing bottom trawl closure areas where coral, bryozoans, and sponges had previously been taken as bycatch and 2) establishing bycatch limits for these invertebrates. This alternative would also increase monitoring for enforcement.

Rationale
The rationale for including this alternative for analysis is the same as that identified for Alternative 5A, but would include more restrictions to minimize potential effects on corals and sponges due to trawling in the AI.

Alternative 6: Closures to All Bottom Tending Gear in 20 percent of Fishable Waters—This alternative would amend the GOA and BSAI Groundfish FMPs, the Alaska Scallop FMP, the BSAI Crab FMP, and the Pacific Halibut Act regulations to prohibit the use of all bottom tending gear (dredges, bottom trawls, pelagic trawls that contact the bottom, longlines, dinglebars and pots) within approximately 20 percent of the fishable waters (i.e., 20 percent of the waters shallower than 1,000 m) in each of the regions described below.

Gulf of Alaska: The GOA would be subdivided into three regions: Western (corresponding to regulatory area 610), Central (areas 620 and 630), and Eastern (areas 640 and 650).

Aleutian Islands: The AI would be subdivided into four regions: Western (corresponding to regulatory area 543), Central (area 542), Eastern (area 541), and two smaller EBS regulatory areas next to the Aleutians (combination of areas 518 and 519).

Bering Sea: The EBS would be subdivided into three regions south of St. Lawrence Island denoting each of the predominant substrate types (sand, sand/mud, and mud) and taking into consideration the varying depth distribution of each substrate.

The closed areas were identified based on the presence of habitat, such as high relief coral, sponges, and Boltenia, with emphasis on areas with notable benthic structure and/or high concentrations of benthic invertebrates that provide shelter for managed species. The closed areas would include a mix of relatively undisturbed habitats and habitats that are currently fished. Within a given region, existing area closures could comprise all, or a portion of, the closed areas for this alternative.

C.2 DESCRIPTION OF THE FISHERIES

The fisheries off Alaska are an economically important segment of the United States domestic fishing industry. Commercial fishery landings off Alaska totaled approximately 2.28 million metric tons (mmt) in 2001, compared to 2.03 mmt in 2000 (NMFS 2002a). The ex-vessel value of the catch, excluding the value added by processing, was estimated at $974.2 million in 2001, a decrease of $152.2 million from the estimated 2000 ex-vessel value of $1.13 billion. In 2001, domestic landings of seafood products off Alaska represented 53 percent of the United States total landings and 27 percent of the total ex-vessel value. Groundfish accounted for the largest share of the ex-vessel value of all commercial fisheries off Alaska in 2001 at $542.8 million (56 percent), while the Pacific salmon catch was second at $188.5 million (19 percent), shellfish catch was third in value at $123.5 million (13 percent), halibut was fourth in value at $109.0 million (11 percent), and herring accounted for $10.4 million ex-vessel value (1 percent) (Hiatt et al. 2002).

The value of the 2001 catch, after primary processing, was approximately $2.4 billion. This estimate includes the value added by at-sea and shoreside processors, typically characterized as representing the first wholesale gross product value. The following is a brief description of the fisheries off Alaska. A somewhat more detailed description of federal and state managed fisheries off Alaska is provided in EIS Section 3.4.

C.2.1 Harvesting Sector

An extensive description of the North Pacific and EBS harvesting sectors is contained in the Draft Programmatic Groundfish SEIS Chapter 3 (NMFS, 2001a) as well as in the Steller Sea Lion Protection Measures SEIS and RIR (NMFS, 2001b), and the Annual SAFE documents. These documents contain greater detail on the wide variety of operational modes represented in this sector of the Alaska fishing industry.

C.2.1.1 Groundfish

Groundfish off Alaska are harvested by two main fleet components: 1) catcher vessels that harvest fish for delivery to shoreside or at-sea processors (i.e., motherships, catcher-processors), and 2) factory vessels that catch and process groundfish into value-added products onboard the vessel.

C.2.1.1.1 Catcher Vessels

Groundfish catcher vessels are typically smaller than their catcher-processor counterparts, and they use pelagic and non-pelagic trawl, longline, pot, jig, or dinglebar troll gear to target a wide range of demersal and pelagic species. Catcher vessels operate in both the BSAI and the GOA. They may deliver their catch to on-shore processing plants and in-shore floating processing ships or to motherships and catcher-processors at-sea. Catcher vessels range in size from under 18.3 m (60 feet) to more than 37.8 m (124 feet). Catcher vessels target a number of FMP and state-managed groundfish species, including pollock, Pacific cod, rockfish, flatfish, sablefish, Atka mackerel, and other species. Shorebased and mothership processors depend upon catcher vessels for raw fish for processing.

In 2001, catcher vessels harvested and delivered 932,000 metric tons (mt) of groundfish, representing 47 percent of the total harvest of 1.997 mmt (Table 2.1-1) (Hiatt et al. 2002). The ex-vessel value of groundfish landed by the catcher-vessel fleet in Alaska in 2001 totaled $288.8 million, or 53 percent of the entire ex-vessel value of $542.5 million (Table 2.1-2) (Hiatt et al. 2002; Queirolo, L., June 2003, personal communication). The $288.8 million value includes an implied ex-vessel value from catcher-processors, derived by applying an average reported shoreside processor price, by species, to the retained catch totals for each catcher-processor. Because no actual ex-vessel transaction occurs here, these are only hypothetical values and may not reflect the actual ex-vessel value of these landings.

Catcher vessels reportedly accounted for 789,000 mt or 43 percent of groundfish harvests in the BSAI, and 144,000 mt or 79 percent of the groundfish harvests in the GOA in 2001 (Table 2.1-1). Catcher vessels accounted for an estimated $189 million, or 44 percent of the ex-vessel value of all groundfish harvested in the BSAI in 2001, and $100 million or 85 percent of the ex-vessel value of groundfish harvested in the GOA (Table 2.1-2).

In 2001, catcher vessels using trawl gear accounted for 771,000 mt or 98 percent of the total catcher-vessel harvest of groundfish in the BSAI, followed by vessels using pots that caught 14,000 mt, or less than 2 percent, and vessels using hook and line that caught 2,000 mt, or less than 1 percent. In the GOA, catcher vessels using trawl gear accounted for 119,000 mt, or 82 percent, of the 2001 groundfish catch. They were followed by catcher vessels using hook and line gear that caught 19,000 mt, or 13 percent, and vessels using pots that caught 6,000 mt, or 4 percent, of the total GOA catcher-vessel harvest.

There were 1,285 catcher vessels that caught federally managed groundfish off Alaska during 2001 (Table 2.1-3) (Hiatt et al. 2002). Catcher vessels operating in the GOA totaled 1,115, compared with 308 catcher vessels operating in the BSAI. In 2001, 201 catcher vessels used trawl gear compared with 967 that used hook and line gear and 205 vessels that used pot gear.

C.2.1.1.2 Catcher-Processors

Catcher-processors are vessels that harvest and process seafood and related products at sea. Groundfish catcher-processors include trawlers (both PTR and NPT), hook and line, and pot vessels. Catcher-processor trawlers can be further subdivided as AFA-qualified and non-AFA qualified vessels. The AFA-qualified vessels fish primarily for pollock, Pacific cod, and some flatfish.

Non-AFA qualified vessels fish mainly for flatfish, Pacific cod, rockfish, and Atka mackerel. Catcher-processors range in size from less than 37.8 m (less than 124 feet) to more than 79.2 m (more than 260 feet). Most catcher-processors operate in the BSAI, but other than AFA-qualified vessels, catcher-processors of each gear type also operate in the GOA. Catcher-processors are an important harvesting and processing component of the Alaska groundfish industry.

In 2001, catcher-processors harvested 1.064 mmt of groundfish, or 53 percent of the total groundfish catch of 1.997 mmt (Table 2.1-1). Catcher-processor groundfish harvests of 1.027 mmt occurred in the BSAI, compared with 38,000 mt in the GOA. In 2001, catcher-processors accounted for an estimated total first wholesale product value of $691.6 million for federally managed groundfish species off Alaska, with $664.7 million from the BSAI and $26.9 million from the GOA (Hiatt et al. 2002).

The hypothetical ex-vessel equivalent value of groundfish harvests by catcher-processors totaled $253.7 million, or 47 percent of the total equivalent ex-vessel value of groundfish harvested off Alaska in 2001. Of this total ex-vessel value, $237.1 million or 93 percent occurred in the BSAI and $16.6 million or 7 percent occurred in the GOA (Table 2.1-2). Catcher-processors using trawl gear accounted for $175.8 million of equivalent ex-vessel value or 69 percent of the total catcher-processors groundfish harvest value in 2001, followed by $75.1 million or 30 percent for catcher-processors using hook and line gear, and $2.8 million or 1 percent for catcher-processors using pot gear.

In 2001, 91 catcher-processors caught groundfish off Alaska, with 90 vessels operating in the BSAI and 40 vessels operating in the GOA (Table 2.1-3). Catcher-processors using trawl gear (NPT and PTR) totaled 40 vessels throughout the EEZ off Alaska, with 39 vessels operating in the BSAI and 18 vessels in the GOA. Forty-five catcher-processors used hook and line gear in 2001, with all 45 vessels operating in the BSAI, and 20 of these also fishing in the GOA. Eight catcher-processors used pot gear to harvest groundfish in 2001, with six vessels operating with pot gear in the BSAI and four vessels in the GOA.

In 2001, catcher-processors accounted for an estimated total first wholesale product value of $691.6 million for federally managed groundfish species off Alaska, with $664.7 million from the BSAI and $26.9 million from the GOA (Hiatt et al. 2002).

C.2.1.2 Salmon

The federal government has management responsibility for the salmon troll fishery in the EEZ outside of state waters, but defers management authority over this fishery to the State of Alaska. Most salmon fishing effort and harvest occur within state waters. A variety of harvest methods and gear are employed in the salmon fishery, although only trolling is authorized in federal waters. The major gear groups used include purse seine, drift gillnet, set gillnet, troll, beach seine, and fish wheel. Salmon harvest occurs throughout the State of Alaska, with the most effort and greatest harvest in the state waters adjacent to the GOA and the EBS and considerably less salmon harvest in the AI's state waters. A detailed description of salmon fisheries off Alaska can be found in Sections 3.4.1.5 and 3.4.2.5 of the EIS.

In 2001, 11,160 Alaska Limited Entry salmon permit holders held 11,682 different salmon permits. The number of permit holders making salmon landings totaled 7,306 individuals, fishing 7,372 permits (CFEC Permit Database). A total of 348,740 mt (768.84 million pounds) of salmon were landed, with an ex-vessel value of $229.2 million. Total commercial landings of salmon from state waters adjacent to the EBS totaled 42,180 mt (14 percent), worth $42.2 million (18 percent), and harvested by 4,402 permit holders. Commercial salmon landings from state waters adjacent to the GOA totaled 300,265 mt (86 percent), worth $187.0 million (82 percent), and harvested by 3,050 permit holders. Distribution of catch and value in salmon fisheries changes from year to year, depending on species composition and size of returning runs to individual locations in Alaska, as well as international and domestic market conditions.

C.2.1.3 Crab

The king and Tanner crab fisheries in the BSAI are governed under a federal FMP, but responsibility for management is deferred to the State of Alaska. Crabs are caught by pots and rings in Alaska. Dungeness, king, snow (*Chionoecetes opilio*), Tanner (*Chionoecetes bairdi*), and Korean horsehair crab are the dominant species harvested (not in that order of economic importance). There are 1,622 crab permits issued to 1,236 permit holders (CFEC Permit Database). In 2001, 880 permit holders fished 1,163 permits and caught a total of 20,734 mt (45.71 million pounds) of crab worth approximately $114.5 million at an ex-vessel level (Alaska Department of Fish and Game [ADF&G] 2002).

In 2001, crab catch in the GOA totaled 2,554 mt (5.63 million pounds) with an estimated ex-vessel value of $11.73 million. BSAI crab catches totaled 18,180 mt (40.08 million pounds) with a value of $102.79 million. King crab represented the largest ex-vessel value of crab harvested in Alaska in 2001, at $66.02 million, with $2.37 million (4 percent) harvested from the GOA by 89 permit holders and $63.65 million harvested in the BSAI by 317 permit holders. In 2001, the total ex-vessel value of Tanner crab landings was $43.69 million (including both opilio and bairdi in GOA, opilio only in BSAI). Three hundred and ten permit holders in the GOA accounted for $4.55 million (10 percent) of this total, and $39.14 million (90 percent) was harvested in the BSAI by 220 permit holders.

C.2.1.4 Scallop

The scallop dredge fishery is covered under a federal FMP, but the management of the fishery is the responsibility of the State of Alaska. Scallop fishing occurs in state and federal waters in the GOA and the BSAI. The fishery is managed on a guideline harvest range (GHR) basis, similar to a guideline harvest limit (GHL), by ADF&G registration area. The fishery has 100 percent observer coverage. Scallops are caught by dredge, and shucked onboard the vessel. The fishery evolved from an open access fishery to a limited-entry-permit fishery with nine permitted vessels in 1999. In May 2000, a cooperative was formed among six of the nine scallop vessels. This effectively reduced the number of actively fishing vessels to six, three in the cooperative and three fishing independently. There are three larger vessels greater than 21 m (71 feet) and three smaller vessels less than 21 m (71 feet) operating in the fishery, depending on the year. In the 2001/02 season, four vessels made deliveries of 251.7 mt (554,831 pounds) of shucked scallop meat, worth an estimated $2.91 million at an ex-vessel level. In the 2001/02 season, four vessels made eight landings of scallops totaling 117.8 mt (259,672 pounds) and worth $1.36 million from the Kodiak Registration Area. Catches occurred in both the Northeast and the Shelikof districts. An additional three vessels made five landings of 63.9 mt (140,871 pounds) of scallops worth an estimated $739,572 from the EBS Registration Area.

C.2.1.5 Halibut

Halibut fishing occurs throughout Alaska in the BSAI and GOA. The halibut fishery is primarily managed by the International Halibut Commission (IPHC). The Council, with approval by the Secretary of Commerce, may develop regulations that are in addition to, and not in conflict with, regulations adopted by IPHC. The halibut fishery off Alaska is a limited-entry fishery, with an individual transferable quota system that allows fishermen to fish a known percentage of the allowable harvest. Halibut are caught mainly with longline gear, but are also taken by hand troll, dinglebar troll, and mechanical jig fisheries. In 2001, there were 3,153 permit holders with 3,288 halibut permits. A total of 2,419 permit holders actively fished 2,461 permits and caught 25,681 mt of halibut, with an ex-vessel value of approximately $110.6 million. Halibut fisheries are important economic, social, and cultural components of many Alaska coastal communities, particularly in the GOA and the Pribilof Islands.

C.2.2 Processing Sector

There are three main components to the seafood processing industry in Alaska: shoreside processors (both onshore and fixed floating), mothership-processors, and catcher-processors. Shoreside processors and mothership-processors depend on catcher vessel deliveries of raw catch. Catcher-processors process the fish they catch themselves and occasionally take deliveries of catch over the side from catcher vessels. Crab and groundfish are processed by all three components of the Alaska processing industry. Salmon and herring typically are processed by shoreside processors. Halibut are processed at shore plants. Scallops are shucked at sea on the catcher vessels, and the meats are delivered ashore. Three motherships operating in the EBS take deliveries of pollock and Pacific cod.

In recent years, ADF&G has reported 364 active processors, composed of 195 catcher-processors, 146 shoreside processors, and 23 floating processors. In 2001, 69 shoreside processors (including non-mothership floating processors), 88 catcher-processors, and 3 motherships participated in groundfish processing. Ten shoreside processors, seven catcher-processors, and three shoreside floating processors participated in crab processing. Within the catcher-processor fleet that targeted groundfish in 2001, 44 vessels used hook and line, producing $126.1 million in products at the first wholesale level; 39 vessels used trawl gear, producing $559.5 million in products; and 6 vessels used pot gear, producing $4.38 million in products (Hiatt et al. 2002).

In 2001, shoreside processors produced a total of $1.376 billion in seafood and related products. In 2001, a total of 69 shoreside processors produced $609.5 million of groundfish products, 115 shoreside processors produced $512.9 million of salmon products, 54 shoreside processors produced $121.3 million of crab products, 73 shoreside processors produced $112.0 million of halibut products, and 48 shoreside processors produced $20.2 million of other seafood and related products (ADF&G Commercial Operators Annual Report, ADF&G Intent to Process (Table 2.2-1).

C.2.3 Dependent Communities

Analysis of community dependency and impacts is guided by National Standard 8 under the Magnuson-Stevens Act, along with associated guidelines. National Standard 8 states the following:

> Conservation and management measures shall, consistent with the conservation requirements of this [Magnuson-Stevens] Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities and (B) to the extent practicable, minimize adverse economic impacts on such communities (Sec. 301(a)(8)).

The Magnuson-Stevens Act defines a 'fishing community' as "...a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and United States fish processors that are based in such community" (Sec. 3 [16]). NMFS further specifies in the National Standard guidelines that a fishing community is "...a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (for example, boatyards, ice suppliers, tackle shops)" (63 FR 24235, May 1, 1998). 'Sustained participation' is defined by NMFS as "...continued access to the fishery within the constraints of the condition of the resource" (63 FR 24235, May 1, 1998). Consistent with National Standard 8, this section first identifies affected regions and communities and then describes and assesses the nature and magnitude of their dependence on and engagement in the fisheries relevant to this analysis.

C.2.3.1 Regional Fishery Dependence Profiles

The groundfish catcher-vessel fleet that harvests in areas potentially directly affected by regulations associated with any of the alternatives being considered is large and widely dispersed among many communities. In addition to harvesting groundfish, these vessels also participate in a number of other fisheries, some of which may also be indirectly affected by the various alternatives. Table 2.3-1 provides a count of groundfish catcher vessels harvesting in areas potentially affected by one or more of the alternatives (based on 2001 data) by the community of residence of the vessel owner. This table also contains information on the participation of these vessels in specific groundfish fisheries, as well as in halibut, crab, scallop, salmon, and herring fisheries. As shown, 223 Alaska-owned groundfish vessels from 28 communities participate in the various potentially affected fisheries. Ownership of many vessels is concentrated in relatively few communities. Communities with 5 or more vessels include King Cove (13 vessels), Sand Point (28 vessels), Unalaska (5 vessels), Anchorage (11 vessels), Anchor Point (8 vessels), Homer (51 vessels), Nikolaevsk (5 vessels), Kodiak (53 vessels), Willow (5 vessels), and Cordova (9 vessels). In addition to the Alaska vessels, the affected groundfish catcher-vessel fleet includes 47 vessels from 22 Oregon communities (dominated by Newport, with 19 vessels), 119 vessels from 36 Washington communities (dominated by Seattle with 69 vessels), and 15 vessels from communities in other states. Due to confidentiality restrictions, data for many individual communities cannot be disclosed. Table 2.3-2 provides a distribution of groundfish catcher vessels by aggregated area, and Table 2.3-3 provides value of harvest data by these same regional groupings.

Mobile groundfish processors (motherships and catcher-processors) operating in areas potentially directly affected by one or more of the alternatives (or processing catch from catcher vessels harvesting in those areas) are much fewer in number, and the ownership of these vessels is concentrated in very few communities. Like groundfish catcher vessels, in addition to harvesting groundfish, these vessels also participate in a number of other fisheries, some of which may also be indirectly affected by the various alternatives. Table 2.3-4 provides a count of motherships and catcher-processor vessels potentially affected by one or more of the alternatives (based on 2001 data) by community of residence of the owner of the vessel. This table also contains information on the participation of these vessels in specific groundfish fisheries, as well as in halibut, crab, scallop, salmon, and herring fisheries. As shown, all four motherships potentially affected under any of the alternatives have Seattle-based ownership. Among catcher-processors, 13 Alaska-owned vessels from 8 communities participate in the various potentially affected areas, and 5 of these communities have more than 1 similarly situated vessel (Unlaska, Anchorage, Kodiak, and Sitka each have 2, and Petersburg has 3). In addition to the Alaska vessels, 68 catcher-processors from 9 Washington communities would be affected by one or more of the alternatives. Of the Washington vessels, most (57) are from Seattle. Edmonds and Bellingham have three and two catcher-processors, respectively, and no other Washington community has more than one. Four potentially affected catcher-processors are owned in states other than Alaska and Washington. Due to confidentiality restrictions, regional distribution data must be highly aggregated for the mobile processing sector. Table 2.3-5 provides a distribution of mobile processing vessels by state, and Table 2.3-6 provides value of harvest data by these same groupings.

One change in vessel ownership patterns in recent years has been an increase in direct ownership by CDQ groups. These groups include the Bristol Bay Economic Development Corporation (BBEDC), the Aleutian Pribilof Islands Community Development Association (APICDA), the Central Bering Sea Fisherman's Association (CBSFA), the Coastal Villages Region Fund (CVRF), the Norton Sound Economic Development Corporation (NSEDC), and the Yukon Delta Fisheries Development Association (YDFDA). These groups have been using their CDQs to leverage capital investment to increase both harvesting and processing capacity. Acquisition of ownership interest in commercial fishing operations and other fisheries-related enterprises is one important means of directly adding to a CDQ group's economic sustainability, consistent with the program's mandate.

CDQ equity acquisitions in vessels through 2000 are presented in Table 2.3-7. As shown, all six CDQ groups have acquired ownership interests in the offshore pollock processing sector, while four of the groups have ownership interest in entities that process groundfish species in addition to pollock. In most of the mobile processing ventures in which CDQ groups have invested, the groups are minority owners; however, the revenues derived from these investments may be substantial. In terms of harvest vessels, as shown in Table 2.3-7, all groups have acquired interests in harvest vessels, and these span a number of vessel size classes, gear types, and target species. Ownership interests in harvest vessels range from minority to exclusive ownership, with the latter being more common in smaller vessel classes. In addition, two groups, APICDA and NSEDC, have invested in inshore processing plants that process a range of species (Table 2.3-8). These inshore plants include both shore-based and floating processing facilities.

Table 2.3-7. Vessel Acquisitions by CDQ Groups as of 2000

CDQ Group	Vessel Acquisitions (percent ownership in parentheses)
APICDA	• Starbound (20%) 240-foot pollock factory trawler • Bering Prowler (25%) 124-foot longline vessel harvesting Pacific cod and sablefish • Prowler (25%) 114-foot longline vessel harvesting Pacific cod and sablefish • Golden Dawn (25%) 148-foot catcher vessel harvesting Pacific cod, pollock and crab • Ocean Prowler (20%) 155-foot longline-processing vessel harvesting Pacific cod and sablefish • Farwest Leader (25%) 105-foot pot vessel harvesting crab and Pacific cod • Stardust (100%) 56-foot longline vessel harvesting Pacific cod and halibut • Bonanza (100%) 38-foot longline vessel harvesting halibut • AP#1, AP#2, AP#3 (100%) 36-foot longline vessels harvesting halibut and Pacific cod • AP#4, AP#5 (100%) 35.5-foot longline vessels harvesting halibut and Pacific cod • Konrad 1 (75%) 58-foot trawler/pot/tender vessel harvesting Pacific cod and pollock, salmon tender • Nikka D (100%) 28-foot vessel harvesting halibut • Agusta D (100%) 28-foot sportfishing charter vessel • Grand Aleutian (100%) 32-foot sportfishing charter vessel
BBEDC	• Arctic Fjord (20%) 270-foot pollock factory trawler • Bristol Leader (50%) 167-foot longline vessel harvesting Pacific cod, halibut and sablefish • Neahkahnie (20%) 110-foot pollock catcher processor • Northern Mariner (45%) 110-foot crab vessel • Bristol Mariner (45%) 125-foot crab vessel • Nordic Mariner (45%) 121-foot crab vessel • Cascade Mariner (40%) 100-foot crab vessel
CBSFA	• American Seafoods, LP (22.5%), which owns the following 270- to 340-foot catcher processors harvesting pollock, Pacific cod, yellowfin sole and rock sole: American Dynasty, Katie Ann, Northern Eagle, Ocean Rover, Northern Jaeger, American Triumph, and Northern Hawk • Zolotoi (20%) 98-foot crab vessel • Ocean Cape (35%) 98-foot crab vessel
CVRF	• American Seafoods, LP (22.5%), which owns the following 270- to 340-foot catcher processors harvesting pollock, Pacific cod, yellowfin sole and rock sole: American Dynasty, Katie Ann, Northern Eagle, Ocean Rover, Northern Jaeger, American Triumph, and Northern Hawk • Ocean Prowler (20%) 155-foot longline-processing vessel harvesting Pacific cod and sablefish • Ocean Harvester (45%) 58-foot longline vessel harvesting halibut and Pacific cod • Silver Spray (50%) 116-foot crab vessel and Pacific cod freezer boat
NSEDC	• Glacier Fish Company (50%), which owns the following 201- to 276-foot catcher processors harvesting pollock and Pacific cod: Northern Glacier and Pacific Glacier • Norton Sound (49%) 139-foot longline vessel • Golovin Bay (100%) tender • Norton Bay (100%) tender

CDQ Group	Vessel Acquisitions (percent ownership in parentheses)
YDFDA	• Emmonak Leader (75%) 103-foot catcher vessel harvesting pollock • Alakanuk Beauty (75%) 105-foot catcher vessel harvesting pollock • Golden Alaska (19.6%) 308-foot pollock mothership • Blue Dolphin (100%) 47-foot longline/crab vessel • Lisa Marie (100%) 78-foot trawl/pot/longline vessel

Source: DCED 2001

Table 2.3-8. Inshore Processing Plant Acquisitions by CDQ Groups as of 2000

CDQ Group	Inshore Plant Acquisitions (percent ownership in parentheses)
APICDA	• Atka Pride Seafoods, Inc. (100%) processes halibut. • Bering Pacific Seafoods (50%) processes Pacific cod, salmon and other species.
NSEDC	• Norton Sound Seafood Products (100%) processes mainly salmon. • Norton Sound Crab Company (100%) processes mainly crab.

Source: DCED 2001

Many onshore and inshore floating groundfish processing vessels (that is, floaters) process catch from vessels that obtain at least some of their harvest from areas potentially directly affected by at least one of the alternatives. In addition to processing groundfish, these processors also participate in a number of other fisheries, some of which may be indirectly affected by the various alternatives. Table 2.3-9 provides a count of groundfish processors that receive catch from vessels harvesting in areas potentially affected by one or more of the alternatives (based on 2001 data) by community of operation for the facility. This table also contains information on the participation of these operators in specific groundfish fisheries, as well as in halibut, crab, scallop, salmon, and herring fisheries. As shown, 2 floaters and 71 shore plants in 41 Alaska communities participated in the various potentially affected fisheries, along with 2 floaters and 1 shore plant that are coded in the data as operating in Washington. Due to confidentiality restrictions, processing value data can be disclosed for only a few communities. Table 2.3-10 provides a distribution of groundfish shoreside processors by aggregated area, and Table 2.3-11 provides ex-vessel value of catch delivered to these processors by affected catcher vessels by these same regional groupings.

In addition to the groundfish fishery, entities participating in a number of other fisheries would be potentially affected by at least one of the alternatives (Alternative 6). Predominant among these would be the crab and halibut fisheries. The crab catcher-vessel fleet that harvests in areas potentially affected by any of the alternatives being considered is large, but is less widely dispersed among communities than is the groundfish catcher-vessel fleet. Table 2.3-12 provides a count of crab-catcher vessels harvesting in areas potentially affected by at least one of the alternatives (based on 2001 data) by community of residence of the owner of the vessel. As shown, 50 Alaska-owned crab vessels from 11 communities participate in the potentially affected fisheries. Fully half (25) of the vessels are owned by Kodiak residents. Residents of no other single Alaska community own more than 6 potentially affected vessels. Communities with two or more vessels include King Cove (two vessels), Sand Point (three vessels), Anchorage (five vessels), Homer (six vessels), Sitka (two vessels), and Petersburg (three vessels). In addition to the Alaska vessels, the affected crab catcher-vessel fleet includes 17 vessels from Oregon (including 11 from Newport), 111 vessels from Washington (including 78 from Seattle), and 2 vessels from other states. Due to confidentiality restrictions, data for many individual communities cannot be disclosed. Table 2.3-13 provides a distribution of crab catcher vessels by aggregated area, along with associated ex-vessel harvest values. Only six crab catcher-processors would be affected by any alternative (only Alternative 6). Of these, five are owned by residents of Seattle, and one is owned by a resident of Kodiak.

The halibut catcher-vessel fleet that harvests in areas potentially affected by any of the alternatives being considered is large and widely dispersed among numerous communities. Table 2.3-14 provides a count of halibut catcher vessels harvesting in areas potentially affected by at least one of the alternatives (based on 2001 data) by community of residence of the owner of the vessel. As shown, 358 Alaska-owned halibut vessels from 44 communities participate in the potentially affected fisheries. Communities with 5 or more vessels include Sand Point (13 vessels), Anchorage (12 vessels), Juneau (18 vessels), Homer (44 vessels), Seward (8 vessels), Anchor Point (5 vessels), Ketchikan (14 vessels), Kodiak (90 vessels), St. George (8 vessels), Craig (7 vessels), Sitka (41 vessels), Port Alexander (8 vessels), Cordova (7 vessels) and Petersburg (38 vessels). In addition to the Alaska vessels, the affected halibut catcher-vessel fleet includes 31 vessels from Oregon (with only Woodburn [7] and Newport [6] having 5 or more vessels), 92 vessels from Washington (with only Seattle [25], Anacortes [11], Port Townsend [7], and Edmonds [5] having 5 or more vessels), and 9 vessels from other states (with 1 unknown). Due to confidentiality restrictions, data for many individual communities cannot be disclosed. Table 2.3-15 provides a distribution of halibut catcher vessels by aggregated area, along with associated ex-vessel harvest values. Although some halibut is processed by catcher-processors, there is no specialized halibut catcher-processor fleet similar to that for groundfish and crab.

Existing conditions for the scallop fishery have changed substantially in recent years with the implementation of a license limitation system and the formation of a co-op within the fishery. In at least some recent years (since 1998), multiple vessels from Kodiak, along with single vessels from Kenai, Anchorage, and Ester, Alaska, show harvests in the areas that would be affected by at least one alternative. However, 2001 data show that only three scallop catcher-processors fished in potentially affected areas, none of which was owned in Alaska; two were from Washington, and one was from another state.

C.2.3.2 Regional Socioeconomic Profiles

Regions and communities engaged in and/or dependent upon the fisheries encompassed by this RIR span a large portion of coastal Alaska and include communities in the Pacific Northwest as well. These regions vary considerably in their socioeconomic structure, and include communities of widely varying scales from small, relatively isolated Alaska Native villages to the greater Seattle metropolitan area. The specific geographic footprint of engagement with or dependence upon commercial fishing varies by the specific fishery involved. For example, many communities are engaged in the groundfish fisheries, while the scallop fishery involves few communities in a relatively small area.

With the exception of Alternative 6, impacts on dependent communities from each of the alternatives, where they occur, would result from alternative-driven changes to groundfish fisheries (and associated indirect and induced impacts). Regional socioeconomic profiles specific to the groundfish fisheries are available in a recently prepared summary (Downs 2003), and a more detailed treatment with individual community profiles may be found in the *Sector and Regional Profiles of the North Pacific Groundfish Fisheries* (posting date 01/28/02) available on the Council website (http://www.fakr.noaa.gov/npfmc/). While directed at groundfish fisheries, these profiles also contain a considerable amount of information on harvester and processor diversity on a regional basis with respect to crab, salmon, and halibut fisheries.

In addition to the groundfish fisheries, Alternative 6 also has the potential to result in significant impacts to communities through direct changes in the crab, scallop, and halibut fisheries. A recently prepared summary document (Downs 2003) presents regional and community information on the crab fisheries, and more detailed information on individual crab fishing communities may be found in the BSAI Crab Fisheries SEIS Appendix 3: Social Impact Assessment (draft release in process). Information on the regional distribution of the scallop and halibut fisheries may be found in Sections 3.4.1.4.4 and 3.4.2.1.4, respectively, of the EFH EIS. The scallop fishery has few participating entities, and vessel ownership (and landings) within Alaska are tightly concentrated in the Kodiak and Cook Inlet areas. Socioeconomic profiles of these areas are contained within the groundfish regional information. The halibut fishery spans a wide area and involves dozens of communities. While recent socioeconomic profile information is not available at the same level of detail for the overall area encompassed by the halibut fishery as for the groundfish and crab regions and communities, considerable information on the socioeconomic context of key communities for the analysis of Alternative 6 (e.g., St. Paul) is available in both the groundfish and crab sources noted previously.

Beyond those communities directly engaged in the fishery through local fleets or processing, a number of communities in the community development quotas (CDQ) region could experience impacts as a result of the effect of the alternatives. Socioeconomic profile information specific to the CDQ region may be found in the Steller Sea Lion Protection Measures SEIS (NMFS 2001) and in an updated form in the BSAI Crab Fisheries SEIS Appendix 3: Social Impact Assessment (draft release in process). Regional demographic information relevant to environmental justice considerations may be found in these same sources, as well as in a recently prepared summary specific to EFH considerations (Downs 2003).

C.3 ANALYSIS OF ALTERNATIVES

As previously referenced, NMFS guidance for preparation of RIRs provides that "At a minimum, the RIR . . . should include a good qualitative discussion of the economic effects of the selected alternatives. Quantification of the effects is desirable, but the analyst needs to weigh such quantification against the significance of the issue and available studies and resources" (NMFS 2000(d), page 2).

Data limitations largely preclude a quantitative analysis of the relative economic and socioeconomic impacts of the several proposed actions. Data deficiencies include the following:

1. Cost and operating structure of the groundfish, halibut, salmon, crab, or scallop (i.e., potentially affected) segments of the industry
2. The linkages between changes in fishing behavior and catch per unit of effort, PSC, and bycatch rates
3. Probable operational adjustments and coping strategies (e.g., effort redeployment patterns) that may be adopted by various elements of the industry in response to one or another of the proposed EFH fishing impact minimization alternatives
4. Market demand and price responses to supply shocks (e.g., reduced quantities; changes in timing, quality, or product form; etc.)
5. Affiliation and ownership linkages (both horizontal and vertical), which may influence the economic viability of any given operation following a significant structural change in the fishery that is attributable to adoption of an EFH fishing impact minimization alternative

Therefore, except in the specific case of differential impacts on gross revenues attributable to each of the six primary alternatives (treated in Section 1.4), the ability to quantitatively distinguish between the effects of the suite of fishing impact minimization alternatives (and options) is quite limited within this analysis. With the single exception of gross revenues, the balance of the regulatory impact analysis is primarily limited to characterizing the nature, probable direction, and (in some cases) the likely gross magnitude of attributable economic and operational impacts accruing from these alternatives. Impacts have been monetized wherever possible and appropriate.

C.3.1 Approach in this Analysis

The first section of the analysis of each alternative presents potential benefits attributable to, or deriving from, the alternative fishing impact minimization measures under consideration by NMFS and the Council. The second section of the analysis of each alternative presents the costs associated with the fishing impact minimization measures under consideration. These analyses are conducted from the point of view of all citizens of the United States; that is, they seek to address the question: "What is likely to be the net benefit to the nation?"

The costs and the benefits of the EFH alternatives would not be homogeneously distributed across theat population. Many of the costs, in particular, are highly concentrated on particular fishing industry components affected by the different EFH habitat protection alternatives, on fishing communities dependent on that industry component, and on sectors of the economy that supply goods and services to, or otherwise support, that industry component. Therefore, the second part of the analysis (beginning in Section 3.2.3 for Alternative 1) reviews and evaluates, to the extent practicable for each alternative, the distribution issues and the implications of fishing impact minimization measures. Section 3.9 summarizes these benefits, costs, and distribution impacts across all alternatives under consideration for EFH protection.

The fishing impact minimization alternatives discussed in this analysis address concerns that ongoing fishing activity may be adversely modifying habitat, faster than the habitat can renew itself. In economic parlance, one might say that ongoing fishing activity is consuming fish habitat and by implication, potentially depleting its ability to provide a range of ecological services. The EFH fishing impact minimization alternatives are premised on the idea that society can consume the habitat and enjoy its ecological services (including fish production) now, or that it can defer that consumption and enjoy those services in the future. This tradeoff between present and future consumption of EFH reflects the underlying investment nature of the problem the alternatives seek to address. The overarching economic options are to (a) continue (perhaps even increase) current consumption of habitat services, with consequent increased costs and reduced benefits, or (b) invest in long-term resource productivity by deferring consumption of these assets until some future time. The expectation, not yet confirmed, for the proposed EFH action is that by reducing the rate of exploitation of EFH (i.e., net benefits from fishing) in the short term, society will have invested in sustaining (perhaps even enhancing) habitat and will enjoy larger net benefits over the longer term.

The benefits associated with the fishing impact minimization measures are addressed in Section 3.1.1 under two major headings, as follows:

1. Passive-use (or non-use) benefits
2. Use benefits (including non-consumptive use benefits, consumptive use benefits, non-market benefits, and market benefits) and productivity benefits

The results of the analysis of benefits under each alternative are presented in Sections 3.2.1 through 3.8.1 and are compared among alternatives in Section 3.9.

The costs associated with the fishing impact minimization measures are addressed in Section 3.1.2 under eight major headings:

1. Revenue at risk
2. Product quality and revenue impacts
3. Operational costs
4. Safety impacts
5. Impacts on related fisheries
6. Costs to consumers
7. Management and enforcement costs
8. Impacts on dependent communities

Costs associated with each of the alternatives are presented in Sections 3.2.2 through 3.8.2 and compared among alternatives in Section 3.9.

The distributional impacts on revenue at risk are summarized in three subsections under the following headings.

1. Geographic area—EBS, AI, and GOA
2. Fishery—groundfish, salmon, crab, scallop, halibut, and other fisheries
3. Fleet component—catcher vessels and catcher-processors

Distributional impacts are also presented for dependent communities in terms of tax revenues, other community impacts, and CDQ groups.

The distributional impacts associated with each of the alternatives are presented in Sections 3.2.3 through 3.8.3 and compared among alternatives in Section 3.9.

The methodology described below is relevant to the approach taken for each alternative considered and for the comparison of benefits, costs, and impacts among alternatives.

C.3.1.1 Benefits

C.3.1.1.1 Passive-use Benefits

It can be demonstrated that society places economic value on relatively unique environmental assets, whether or not those assets are ever directly exploited. For example, society places real and potentially measurable economic value on simply knowing that a rare or endangered species of animal or plant is protected in the natural environment. The term 'value' is used, in the present context, as it would be in a cost-benefit analysis (i.e., what would people be willing to give up to preserve and/or enhance the asset being assessed?). Because no market, in the traditional economic sense, exists within which EFH (at least in waters of the EEZ off Alaska) is bought, sold, or traded, there is no institutional mechanism wherein a market clearing price may be observed. Such a market clearing price would typically be used to estimate a consumer's willingness-to-pay to obtain the goods or services being traded. Nonetheless, EFH does have economic value, as demonstrated by the current public debate over its preservation and enhancement.

Among those holding these values, there is no expectation of directly using this asset in the normal sense of that term. Whether referred to as passive-use, non-use, or existence value, the underlying premise is that individuals derive real and measurable utility (i.e., benefit) from the knowledge that relatively unique natural assets remain in a comparatively undisturbed state.

Economists define the EFH passive-use value as a public good. A pure public good has the following features: 1) no one can be prevented from enjoying it once it is produced, and 2) one person's enjoyment of the good does not detract from enjoyment of that public good by another person.

Under these conditions, there is a tendency for private sector markets and actions to produce too little of the good. After all, a private firm would have a hard time recovering its costs and realizing a profit if it could not prevent people from consuming (i.e., using or taking enjoyment from) the good once it has been produced. Moreover, from society's point of view, if one person's enjoyment of the good does not reduce another person's opportunity to enjoy it, one might not want to restrict or otherwise ration access, once the good has been produced. For these reasons, private behavior will tend to produce less of a public good than is socially optimal. In other words, private behavior will not sufficiently protect EFH, a public good.

The absence of a traditional economic market for a public good like habitat preservation also makes it hard for economists to place monetary values on the proposed fishing impact minimization measures, whether in the aggregate or with respect to any one of the suite of potential actions under consideration by the Council within the scope of this EIS/RIR.

The concept of passive-use value is well established in economic theory, supported by a growing body of empirical literature, increasingly employed in both public and private valuation analyses, and accepted by most as a legitimate, appropriate, and necessary aspect of natural resource policy and management decision-making. In point of fact, there is no theoretical reason to limit these non-market, passive-use values exclusively to natural assets, although natural assets are the focus of the current analysis. One may reasonably hypothesize that, for example, there exists substantial passive-use value associated with preservation of antiquities, such as the great pyramids of Egypt.

At present, the only widely accepted means of estimating passive-use values is by surveying people to find out what they would be willing to pay (or willing to accept, depending upon with whom the implicit property right resides) for any given action that affects a resource for which non-market values are hypothesized to exist. This approach is termed the 'contingent value' method (CVM). A substantial body of empirical literature has developed, over perhaps the last 25 years, describing the application of this technique to the valuation of natural resource assets. The use of CVM has also been carefully reviewed and accepted (when employed appropriately) by the federal courts (*Ohio v. United States Department of the Interior*, 880 F.2 432 [D.C.Cir. 1989]), as well as by NOAA (58 Federal Register 4601, 4602-14 [1993]).

Empirical research on passive-use value, within the broad context of natural resources, suggests that these economic values may be substantial when they exist. When the public is consciously aware of risks posed to a unique asset (e.g., the Amazon rain forest), they often reveal significant willingness-to-pay values for its protection. In that particular example, there is empirical evidence to support the existence of significant passive-use values (e.g., cash donations to various *Save the Amazon Rain Forest* groups or efforts, celebrity-sponsored fund raisers and large monetary donations to the cause, outright purchase of at-risk land, or acquisition of use-rights to at-risk land, etc.). Closer to home, a USDA Forest Service (Forest Service) study that used contingent valuation to measure the value the public places on the existence of critical habitat for the northern spotted owl indicated that Oregon residents were willing to pay between $49.6 million and $99 million (or $28 per acre) (Loomis et al. 1996).

Notwithstanding the examples referenced above, another issue complicates an assessment of the passive-use value of EFH. Typically, passive-use values have been associated with unique, rare, and widely recognized natural assets (e.g., the Grand Canyon of the Colorado). Indeed, more often than not, CVM analyses of passive-use values involve actions that propose to enhance, protect, or mitigate adverse effects on high profile organisms. In the literature, these are referred to as charismatic mega-fauna, and they include such animals as, the great whales, pandas, lions, tigers, and bears.

With respect to EFH, the values at stake are what economists refer to as marginal values; that is, the values are associated with changes in the characteristics of EFH, not in the presence or absence of EFH itself. Any region of EFH will have a wide range of characteristics. These may include the relative proportions of different sea bed types, locations of corals or other living structures, water temperature, salinity, distribution of vegetation, and so on. Fishing activity may change the nature, productivity, and value of the habitat by altering these characteristics in different ways. For example, unrestricted use of a bottom tending gear type may totally eliminate corals and alter the relative proportions of vegetation types, but leave salinity unchanged. The passive use values that society places on different regions of habitat will depend on these characteristics and can be expected to change as various combinations of characteristics of a particular region change.

It is these changes in the character of the habitat, and the consequent changes in the valuation of that habitat, that are at issue. This has two implications for this discussion: 1) estimates of the total value placed on a 'pristine habitat' do not shed light on the costs and benefits of fishing impact minimization alternatives that make marginal changes in the habitat, and 2) potential valuation methods must go beyond questions that simply elicit valuations of undisturbed habitat from respondents. Most bottom habitat in the Aleutian Islands management area has, it is believed, not been impacted in any way by commercial fishing gear. The methods must yield information on how respondent values will change as the vector of habitat characteristics changes.

In the current context, while EFH is clearly valuable because it contributes to the existence and productivity of many living assets for which both market and non-market values exist (e.g., commercial species of fish and shellfish, Steller sea lions, sea birds, and whales of various species), isolating a passive-use value unique to EFH in the EEZ off Alaska presents conceptual problems. While society's desire to preserve and enhance EFH may be regarded as a derived demand because it provides an ecological service that supplies an input to the production of goods and services from which society derives direct consumptive benefit, passive-use values are in addition to the value obtained from derived goods and services. It seems probable that a portion of the willingness to pay for goods and services obtained from the living marine resources of the BSAI and GOA, whether or not it is revealed in a market, has embedded in it the value of EFH. Few holders of these values would likely be able to either explicitly recognize or express them.

That does not imply, however, that these values do not exist, or that with sufficient time and expertise, they could not be measured. It simply means that, to the best of the analysts' knowledge, there has been no study published to date concerning the passive-use value of EFH. Therefore, at present, it is not possible to provide a specific monetary estimate of the passive-use value that is hypothesized to be associated with one or another of the proposed fishing impact minimization alternatives.

While the absence of empirical treatment of these EFH passive-use values is a limitation of the current benefit/cost analysis, previous passive-use value studies provide some basic guidance to decision-makers and the public in evaluating the benefits of protecting EFH, as summarized by the following three points:

(1) Society places a value on habitat for its own sake (i.e., direct benefit), as well as for its role in the functioning of the ecosystem and production of marketable consumptive-use and non-consumptive-use goods (i.e., indirect benefit). The passive-use value placed on habitat by society may differ with the public's perception of the role of the specific habitat in the ecosystem. For example, wetlands habitat may be perceived by the public to be of greater passive-use value than, say, desert sand habitat or Arctic pack ice habitat.

(2) The public perception of passive-use value for marine habitat may be dependent upon how unique that habitat is believed to be within the ecosystem. For example, a relatively rare, long-lived coral habitat's passive-use value as EFH may be perceived to be higher, by the public, than common mud habitat. Therefore, there may be differences in the value society places on EFH, depending upon its specific characteristic.

(3) The likelihood that any given proposed protection measure (e.g., limits on bottom contacting fishing gear, or spatial or temporal area restrictions) will succeed in protecting the habitat may also influence the public's willingness to pay to support an action.

While it is not possible at this time to provide an empirical estimate of the social value attributable to protection of EFH in the EEZ off Alaska, it is implicit in the fishing impact minimization measures that each of the alternatives to the status quo (i.e., Alternative 1) would be expected to yield an incremental social benefit over the baseline condition. That is, it is assumed that each of the alternatives yields some additional protection for EFH from fishing gear impacts, compared to retention of the status quo.

A non-economic, highly simplified physical measure of the expected reduction of attributable fishery impacts on EFH is provided, by area and type of habitat protected, for each alternative considered in the EIS and RIR. This assessment of the comparative contribution of each alternative to the potential EFH benefit stream to society is by necessity limited to an estimate of the area (i.e., square kilometers) that would be protected by the provisions of each alternative designed to minimize fishing impacts on EFH. They are accompanied by a qualitative description of the associated type(s) of habitat explicitly protected under each alternative.

C.3.1.1.2 Use and Productivity Benefits

As noted above, passive-use value (e.g., existence, bequest value) is often regarded as a non-use value because it does not depend on actual or even potential interaction between the person holding the value and the resource being valued. This section addresses values associated with direct use of the resource. Among these use-benefits are several categories: market and non-market, as well as consumptive and non-consumptive uses. Each is addressed below, within the context of its potential relationship to fishing impact minimization measures.

Non-market/non-consumptive uses are, in general, associated with private recreation or leisure activities. The typical example of such a use is bird watching. The user does not enter into a market transaction to acquire access of the resource (here, wild birds), nor does his or her use consume the resource. In the current context, it seems unlikely that non-market/non-consumptive values represent an important aspect of the aggregate benefit attributable to EFH off the coast of Alaska.

Non-market/consumptive uses may include, within the current context, authorized subsistence use of elements of EFH off the coast of Alaska. Some Alaska Native populations have retained the right to exploit the resources of EFH for customary and traditional subsistence activities. It is reported, for example, that subsistence users actively seek out and harvest black and red deepsea corals for use in the production of Native art. There may be other EFH resources from which subsistence users derive value through direct consumption. These extra-market consumptive uses represent a benefit that would be enhanced by EFH protective measures designed to minimize adverse impacts from commercial fishing gear. They are, therefore, appropriately listed among the gains society may expect from adoption of one or more of the alternatives to the status quo. It is not possible, given currently available information, to estimate the size or distribution of this category of benefits.

Market/non-consumptive uses comprise activities that involve a market transaction to acquire access to the resource, but do not involve consumption of the resource. Within the broader context of EFH located in other parts of the United States, an example of this use would be commercial dive services that take tourists out to scuba dive on coral reef formations. It is unlikely, given the geographic location and depth of most of the EFH identified with the subject action, that market/non-consumptive values represent a significant portion of the benefits deriving from this resource off the coast of Alaska.

Analogous market/consumptive uses are also unlikely to represent a significant element in the overall benefit accruing from protection and enhancement of EFH off Alaska, for many of the reasons just identified for market/non-consumptive uses. However, two associated classes of market/consumptive-use values may be identified in connection with fishing impact minimization measures off Alaska, including opportunity reservation value (future consumptive-use value)[1] and production and yield of FMP and other species (consumptive-use value).

Opportunity reservation value is defined here to mean a societal value distinct from traditional option value, the latter being an individually held form of future use value. In this instance, the value being defined may be regarded as a collective hedge against irreversible loss of some highly valuable good or service, flowing from EFH, that has not yet been recognized. That is, ecosystems such as those that comprise EFH are enormously complex and, as yet, not well understood. EFH may provide some future consumptive use benefit that is not currently used, or even identified. For example, minimizing the adverse effects of fishing practices on EFH may preserve a species of plant or animal or an ecological process that, in the future, may prove to have irreplaceable, tangible value to the world's population. Such examples already exist. Specifically, marine sponges have yielded valuable medicinal compounds for use in anti-malaria and HIV infection suppression drugs (Bishop Museum 2000). At present, it is not known whether or how many of these potentially valuable species or functions exist and, therefore, it is not possible to place a monetary value on their future use. Retention of the option to exploit these public assets in the future clearly has some reservation value, and argues for a precautionary management approach (i.e., erring on the side of preserving these assets).

Production and yield of FMP and other species is another class of market/consumptive-use value considered here. Congress defined EFH as "... those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). The EFH regulations further interpret the definition as follows:

> Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to

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[1]See, also, the treatment of "Quasi option value" – the value of preserving a future option given an expectation of the growth of knowledge. In: Pearce, David W. and R. Kerry Turner, *Economics of Natural Resources and the Environment*, Johns Hopkins Press, 1990.

support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and spawning, breeding, feeding, or growth to maturity covers a species' full life cycle.

The amended Magnuson-Stevens Act requires NMFS to minimize damage to EFH from fishing practices, to the extent practicable. Additionally, the Act requires federal agencies that authorize, fund, or conduct activities that may adversely affect EFH to work with NMFS to develop measures that minimize damage to EFH. While NMFS does not have veto authority over federal projects adversely affecting EFH, this mandate enables NMFS to provide guidance to federal action agencies on ways to tailor their projects to minimize harm to EFH. The amended Magnuson-Stevens Act states that EFH conservation will lead to more robust fisheries, providing benefits to coastal communities and commercial and recreational fisheries alike. This assumes that minimizing damage to EFH from fishing practices will sustain or even increase the production and yield from FMP-managed species and other species important to the fishing industry in Alaska, as well as enhance the contribution of these species to a healthy ecosystem.

Current knowledge permits only a highly conditional evaluation of the effects of fishing on general classes of habitat features and allows only broad connections to be drawn between these features and the life history processes of some managed species. The level of effects on the stocks or potential yields of these species cannot be estimated with current knowledge. An expectation of substantial recoveries, directly attributable to implementation of measures to minimize the effects of fishing on EFH, would require the presence of a species with a clear habitat limitation and consequent poor stock condition. Alaska fisheries include no such clear cases. Therefore, no quantifiable or even qualitative measure of sustained or increased yield in production or biomass of FMP species is available for this analysis. That is, based upon currently available scientific data and understanding of these fishery and habitat resources, it is not possible to measure any economic benefits linked to the biological or ecological changes attributable to the proposed EFH action.

C.3.1.2 Industry Costs

C.3.1.2.1 Revenue at Risk[2]

The economic law of demand (e.g., a downward sloping demand curve) suggests that (assuming all other factors are held constant), if fewer units of a normal good or service are supplied, the individual unit price would be expected to rise. This means that, within the limits of this model, and the context of this action, if fewer fish of a given species are harvested, then fishermen should receive more for each unit of that species they continue to catch and deliver to the market, all else equal. Any increase in price that would actually occur would depend on, among other things, how responsive the price consumers are willing to pay is to changes in the quantity of catch supplied. The consumers' willingness to pay more for these products is dependent upon how unique the products are; that is, whether the consumer can substitute a lower cost alternative product. Very little empirical information is available at this time concerning the responsiveness of price to quantity supplied for the species and product forms potentially affected by the EFH alternatives. (Some preliminary work on this subject, specific to pollock, Pacific cod, and Atka mackerel, was undertaken in connection with the Stellar Sea Lion Reasonable and Prudent

[2] Revenue at risk should be regarded as an upper-bound estimate. That is, it represents a projection, based upon historical effort and landings data, of the gross value of the catch that would be foregone as a result of one or more provisions of the proposed action, assuming none of that displaced catch could be made up by shifting effort to another area. In many cases, this will not be the case. Therefore, the true impact on gross revenue is likely to be smaller than the estimated revenue at risk, although that is not assured.

Alternative [RPA] RIR Appendix D [NMFS 2001b]. Interested readers may consult that report for additional detail.)[3]

Increased revenue accruing from such a per-unit price rise would be a benefit to primary producers (i.e., fishermen), offsetting an indeterminate amount of the increased operational costs they would be expected to incur through adoption of any one of the proposed fishing impact minimization alternatives to the status quo. However, to the extent that these fishery products are consumed in the United States, this producer benefit would be, to a very large extent, offset by a reduction in consumer welfare from the increase in price. That is, the benefit to the industry would simply be the result of a transfer from consumers. Thus, under these conditions, this hypothesized supply-induced price increase would create no net benefits that could be revealed in a cost-benefit analysis for domestically consumed fish. Quantity changes under some alternatives under consideration in this action (e.g., Alternative 2) may be small enough to have no perceptible impact on prices, while under other alternatives (e.g., Alternative 6) they may. It is not possible, at this time, to estimate the likelihood or magnitude of these price effects.

Alternatively, to the extent that these fish are exported and consumed outside of the United States, any supply-induced price increase would create an attributable net benefit improvement to the nation, from a cost/benefit perspective. This is because the price increase would accrue, in the form of increased gross revenues, to United States producers, while the loss in consumer welfare would be imposed on citizens of other countries. Under OMB guidelines, costs incurred by (and, for that matter, benefits accruing to) foreign producers and consumers are excluded from the net benefit analysis performed in a Regulatory Impact Analysis. Such changes would (all else equal) have no effect on net benefits to the nation.

The remainder of this section examines the expected potential impacts on industry gross revenues attributable to reductions in seafood and other fish-based products being delivered to market (aside from the price effect), including the potential risk of loss of market share.[4] Accurate estimates of the change in gross revenues from reduced production associated with the fishing impact minimization alternatives require information on 1) the volume of production coming from fishing areas that would be affected by each of the fishing impact minimization measures, for each of the fleet sectors; 2) the extent to which each fleet sector would re-deploy displaced fishing effort into other fishing areas in an attempt to mitigate the loss of production from the areas directly affected by the fishing impact minimization measures; and 3) the relative productivity of the fleet sectors in the new areas compared with the EFH-affected areas.

Currently, it is possible to estimate only the first of these (i.e., the volumes of production coming from areas that would no longer be available to fishermen under each of the alternatives). However, estimates of the volumes of production coming from fishing areas restricted by the fishing impact minimization measures, combined with data on historical ex-vessel and/or first wholesale prices, allows estimates of the gross revenues, for each fleet sector, potentially placed at risk under the different alternatives. To better place these impacts in a comparable empirical context, an analytical approach is adopted here, in which the question evaluated is expressed as follows: "What would the effects of these alternatives have

[3] In an early draft of the cited Stellar Sea Lion (SSL) Appendix D, some very preliminary econometric estimation of seafood demand was attempted. While the effort was commended by reviewers (e.g., SSC), it was deemed to be premature for inclusion in the Final EIS/RIR/IRFA and was eliminated from the document. The Appendix D, referenced here, does not include those empirical modeling sections of concern.

[4] As treated in some detail in *An Analytical Clarification*, above, one would ideally seek to evaluate any attributable effects of these actions in terms of their net results. Because this is not presently possible, for the reasons already discussed, the comparative quantitative assessment presented here focuses on gross measures. The analysts do not assert these measures are close proxies for one another. The analysts do contend that these gross measures can provide useful information to decision-makers, as they consider the expected economic effects of the range of alternatives before them.

been, had each, in turn, been in place (in this example) in 2001?" By posing the analytical question in this way, it is possible to use actual empirical information and official data records on fleet participation, catch composition, production patterns, ex-vessel and first wholesale prices, bycatch quantities, spatial and temporal distribution of effort, and geographical patterns of deliveries to primary processors or transshipping facilities. These estimates can provide a crude measure of the potential economic impact of the alternatives on different fleet sectors. Moreover, if it is assumed that harvest foreclosed to a fleet sector in one area could not have been made up elsewhere by that fleet sector, then the at-risk estimate becomes an approximation of the potential maximum foregone gross revenues directly attributable to the proposed action.

It is also possible to take a further step. Having estimated the maximum gross revenues that might be lost by each fleet segment, on the assumption that the fleet is unable to make up reduced harvests by fishing in other areas, it is possible to gradually relax that analytical constraint by assuming the fleet component would have been able to make up some percentage of the revenue at risk by fishing in other areas not affected by fishing impact minimization measures. This is done without specifying where else the fleet segment might have operated (or at what cost), except to assume that the effort would have been is redistributed to remaining open areas, during remaining open periods, under existing management regulations. With this information available for each fleet segment, readers may apply their own assumptions about the extent to which each fleet segment would be able to make up its catch elsewhere, under the differing temporal and geographic constraints and limitations provided across competeing fishing impact minimization alternatives, should these measures be applied to future fishing effort. In this way, individuals may produce their own estimates of the future gross revenues that might be foregone under each.

To be precise, the gross revenues at risk were estimated using information about the following: 1) projected fleet segment harvests for the 2001 fishing year, assuming the provisions of each EFH alternative had been in place in that year; 2) the actual proportions of harvest of different allocations, by different groups of vessels (e.g., vessel length, gear-type, area, processing mode, target species), based upon historical catch patterns in 2001; 3) information about the proportions of the sea surface area closed by the respective fishing impact minimization alternatives, in different management areas; and 4) estimated product mix and ex-vessel (catcher fleet) or first wholesale (catcher-processor fleet) product values for 2001.

The year 2001 was chosen as the base year for the analysis because 1) it was the most recent year for which complete data on catch were available that incorporated retained harvests by all groundfish vessel classes, as well as for crab, halibut, and scallop operations; 2) the BSAI pollock fishery in 2001 reflects the fleet allocations of the AFA, and the BSAI catcher-processors' activity patterns reflect early AFA experience; and 3) Steller sea lion protection measures, consistent with several different EFH scenarios, were in place in that year.

Harvest tonnages were valued using 2001 ex-vessel prices derived from ADF&G fish ticket data for the catcher-vessel components, and first wholesale prices for 2001 for catcher-processor components. The first wholesale prices were estimated by dividing the total wholesale value of production for a species by estimated deliveries of each species of fish, to yield a round weight per ton of catch equivalent value. First wholesale prices are the prices received by the first level of inshore processors, or by catcher-processors and motherships. They reflect the value added by the initial processor of the raw catch. They are not, therefore, equivalent to ex-vessel prices.

The wholesale values were obtained from State of Alaska Commercial Operators' Annual Reports (COAR reports). Implicit in this procedure is the necessary simplifying assumption, likely not correct, that changes in harvest levels would not change the over all product mix composition(fillets, surimi, meal, roe, etc.) at the first wholesale level. Sufficient information is not available to support a more realistic assumption concerning potential changes in product composition. The first wholesale values by species group, fishing gear, and area for the catcher-processor fleet used in this analysis are summarized in Table 3.1-1.

Anecdotal information suggests that the approach used here to estimate prices may tend to understate the revenues generated in the BSAI headed and gutted (H&G) trawl fleet. If this assertion is correct, it would particularly affect the Atka mackerel revenue estimates included in this report. Nonetheless, the analysis reflects the best official data on price and value currently available. The analytical approach adopted here implicitly assumes constant real prices at the ex-vessel and first wholesale levels. To the extent that real prices have risen since 2001, the gross revenues estimated here for the various alternatives likely understate (to an unknown degree) the true gross revenue impacts that may accrue from adoption and implementation of one or another of these fishing impact minimization measures.

The first step in the analysis was to identify the fleet components and target fisheries which would have been likely to be affected by the different fishing impact minimization measures under each of the alternatives proposed for consideration, had each been in place in 2001. The affected fleet components were further subdivided by gear and vessel size categories. These subdivisions were based upon 2001 catch records, by fleet component, area, and target fishery; the analysts' knowledge of the fisheries; and best professional judgment. To estimate the actual harvest by species at risk, it was necessary to determine what proportion of the 2001 harvest (of each target species and retained bycatch) was potentially at risk, based upon geographic displacement attributable to each fishing impact minimization alternative. To do this, landings for each fleet segment were estimated for each State of Alaska statistical area. GIS techniques were then employed to determine what proportion of the physical surface area of each of these statistical areas was specified as restricted or unrestricted under the unique restrictions appropriate to each of the six fishing impact minimization alternatives. The total landings restricted under each of the alternatives could then be estimated by summing restricted landings for each statistical area for each relevant vessel group, gear type, target species, processing mode, and geographic area. This was accomplished for groundfish harvested under federally managed fisheries using the NMFS single vessel database (SVD) and for groundfish, crab, and halibut harvested under State of Alaska managed fisheries using the AKFIN database. Due to the confidential nature of the scallop dredge fishery, the revenue at risk in the scallop fishery was assessed by ADF&G by comparing fishing impact minimization measure impact areas for Alternative 6 with known locations of scallop beds and determining what percentage of recent annual production and value would be placed at risk based on 2001 guideline harvest ranges and the ex-vessel price for shucked scallop meat (Barnhart, J., June 2003, personal communication).

Finally, the harvest tonnages at risk were valued using either ex-vessel (catcher fleet) or first wholesale (catcher-processor fleet) product values, as appropriate, from the 2001 fishing year.

The analysis of revenue impacts of the alternatives was conducted in terms of several gross revenue categories.[5] The first is the potential maximum gross revenues that could have been generated under each respective alternative. This is simply the gross revenue that would have been generated by the TACs and GLHs, associated with a given alternative, if the entire allowable harvest could have been caught, in the 2001 base year. These may differ between the alternatives depending upon the fleet component and affected target species. The second general category is gross revenues at risk under the different alternatives. Various restrictions in the alternatives may have prevented fleets from harvesting fish at accustomed places, times, or with accustomed gear. The affected fishing fleets may or may not have been able to make up the displaced catch and the gross revenues that would have been lost because of these restrictions, by fishing elsewhere. Because different fleets may potentially have been able to recover some or all of these gross revenues, the income from these catches cannot, strictly speaking, be described as lost. Instead, they have been described here as at risk.

Only if it is assumed that harvest foreclosed to a fleet sector in one area by an alternative could not have been made up elsewhere by that fleet sector would at-risk revenues be an estimate of lost gross revenues. Accurate estimates of the abilities of fleets to make up a reduction in harvests in one area by fishing in another require information on the following: 1) the volume of production affected by the various restrictions, 2) the extent to which each fleet sector would have redirect its operations into other fishing areas, and 3) the productivity of the fleet sectors in the new areas. Currently it is possible to estimate only the first of these, i.e., the volumes of production coming from areas that would no longer have been available to fishermen, in 2001, under each of the proposed alternatives. Only for Alternative 5B, which designates actual reductions in TACs for groundfish target species, based on recent catch volumes coming from high-coral/bryzoan and sponge bycatch areas, can the actual reduction in gross revenues be estimated.

Revenues are placed at risk in three ways, corresponding to three different kinds of limitations the alternatives impose on fishing in EFH. An alternative may absolutely prohibit fishing activity by a particular gear (e.g., non-pelagic trawls) and/or target species (e.g., slope rockfish) within a specified area of EFH. In these instances the EFH area is referred to here as closed and the revenues that might have been generated by fishing with that gear, for that target species, in that closed area, are placed at risk. Secondly, Alternatives 5A and 5B each prohibit the use of non-pelagic trawls for all target species in specific areas, spreading the impacts among a number of target species in the EBS, AI, and GOA. Finally, one alternative, Alternative 6, prohibits the use of all bottom contact gear, including PTR that occasionally touches the seabed, from 20 percent of the fishable waters in all three areas. In this case, the catch and revenues at risk accrue to a potentially much broader segment of the domestic fishing industry, extending to groundfish, crab, halibut, and scallop fishing sectors operating off Alaska. Alternative 6 may affect employers and employees, dependent communities, and families that are, by-and-large, not affected by the somewhat more narrowly focused provisions of the other alternatives (i.e., those that limit regulations to specific gears, target fisheries, or areas).

As noted above, revenues at risk are foregone only if a fishing fleet is unable to modify its operation to accommodate the imposed limits and, thus, cannot make up displaced catches elsewhere (either in remaining open fishing areas or during alternative open fishing periods). Having estimated the maximum revenues that might be lost for each fleet segment, on the assumption that the fleet is unable to make up

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[5] One would, as previously noted, prefer to base these economic impact evaluations on net, rather than gross, measures. However, insufficient data are available to make this conversion. While the analysts in no way wish to imply that gross and net values are proxies for one another, given the data limitations, gross figures are presented in the expectation that they can provide useful insights into the nature of the impacts which may be expected to accompany adoption of any one of the alternatives under consideration.

the affected harvests, it is possible to incrementally relax this assumption and assess the effects. If one assumes that the underlying behavioral model is linear in its parameters, evaluating an alternative assumption about the total foregone catch is straightforward. For example, if one assumes that a given fleet segment is able to make up 10 percent of the harvest elsewhere, the estimated at risk gross revenue impact would be multiplied by 0.90; if the assumption is that, say, 20 percent is made up elsewhere, the total is multiplied by a factor of 0.80, and so forth. This is done without specifying where (or when) the fleet segment might operate, or at what cost. With total revenue at risk information available for each fleet segment, the reader may apply his or her own assumptions about the extent to which each fleet segment would be able to make up its catch elsewhere, thus producing his or her own estimates of the gross revenues that might be foregone under each alternative. Most of the discussion relevant to this approach can be found in this section; Section 3.4, which summarizes the benefits and costs between alternatives; and Section 3.5, which deals with the distribution of impacts among areas, fisheries, fleet components, and dependent communities.

C.3.1.2.2 Product Quality and Revenue Impacts

The fishing impact minimization alternatives considered in lieu of the status quo would impose restrictions on the location of fishing vessel operations that might lead to a decline in product quality and associated reductions in the price the industry receives for fishery products. Changes in product quality may occur for at least two reasons:

- Fishermen may have to fish farther away from processors, requiring them to travel greater distances to deliver their catch.
- Fishermen may be induced to target stocks of sub-optimal sized fish.

C.3.1.2.2.1 Longer Travel to Deliver Fish

The interval between catching and initiating processing groundfish is, reportedly, negatively correlated with product quality (and, thus, value). Some reports suggest that, on a product-for-product basis, the quality of Pacific cod and pollock harvested and processed at-sea is uniformly higher than that of product produced onshore, owing primarily to the significant difference in the interval of time between catching and processing. Inshore processors routinely place limits on the maximum holding time for pollock onboard catcher vessels, and deduct from the price or refuse delivery if the delivery time is exceeded. For those vessels that do not have the capability to process their own catch, given a fixed catch rate and hold capacity, any action that substantially increases the time between catch and delivery imposes costs, both on the harvester and the processor. Beyond some point (which varies by vessel size, configuration, condition of the target fish, and weather/sea conditions) delivery of a usable catch (i.e., one with an economic value to the fisherman and processor) is not feasible.

In this latter connection, a concern common to all operators delivering catch ashore for processing is the effective time limit that exists from first catch onboard until offloading to deliver a salable catch. Informed sources in the industry place the maximum interval at 72 hours (at least in the case of pollock, and perhaps Pacific cod). If fishing grounds that remain open under one or another of the fishing impact minimization alternatives are more remote from sites of inshore processing facilities than the traditional fishing locations, the delivery time for the raw product by the catcher vessel may be lengthened and the value of the delivered product lowered. For smaller vessels with more limited holding capacity and slower running speeds, this limit would impose relatively greater constraints (i.e., operational burdens). The result may be an effective intra-sectoral redistribution of catch share.

Closures (or other operational restrictions) of fishing grounds adjacent to inshore processing facilities may inadvertently redistribute the catch within a sub-sector, from the smaller, least operationally mobile vessels to the larger, faster, more seaworthy elements of the fleet. In the long run, this may have the added (undesirable) effect of inducing further capital stuffing behavior within the industry as those disadvantaged small boat owners perceive the need to invest in added capacity to continue to participate profitably in the fishery.

A number of small catcher vessels participate in bottom contact fishing using non-pelagic trawls, pots, dinglebar troll, and scallop dredge gear, and would be adversely affected by additional running time from remaining areas not restricted or closed by the fishing impact minimization measures to ports with processing and other support facilities. These detailed distributional impacts are discussed further under Section 3.1.2.8, Impacts on Dependent Communities.

C.3.1.2.2.2 Change in Average Size of Fish

A corollary effect of altering the timing and/or location of catch (which each of the five alternatives to the status quo does to one degree or another) might accrue if the average size of fish in the catch falls below the minimum requirement for specific product forms (e.g., deep-skin fillets). These minimums are often dictated by the marketplace, but may also be directly linked to the technical limits of the available processing technology. These impacts could accrue to any or all segments of the fishery. For example, on average, fillet production requires a larger pollock than does, say, surimi production. If spatial displacement (attributable to provisions contained in any specific alternative under review) results in a significant decline in the average size of fish harvested by a given operation, there could be adverse effects on product mix, quality, grade, and value.

For example, IR/IU prohibits the discarding of any pollock or Pacific cod. Product specifications for these species are, as noted above, principally dictated by the marketplace. Therefore, if the average size of fish in the catch declines, perhaps as a result of mandated EFH restriction or closures, increasing amounts of the total catch of these species would be diverted to relatively lower value product forms. For example, if fish are too small for, say, deep-skin fillets, that product form may give way to blocks, IQF shatter pack, etc. Similarly, fillet production could be diverted to surimi and surimi to H&G or mince and meal, etc.

Atka mackerel catch is not governed by IR/IU restrictions. Those close to the industry suggest that there currently exists a marketable minimum size for this species, as well. If the average size fish falls, due to, for example, geographic displacement of fishing effort prescribed by the fishing impact minimization measures, one can anticipate increased discards, with associated higher operating costs per unit of retained catch and product output. Similar outcomes may reasonably be expected in fisheries targeting other species that may be affected by the EFH fishing impact minimization alternative ultimately selected for implementation.

C.3.1.2.3 Operational Costs

Under the five EFH alternatives to the status quo, fishermen would be expected to attempt to minimize losses associated with EFH revenue placed at risk by altering their current operations. These reactions could include the following: 1) redeploying fishing effort, using the same fishing gear and methods, to known adjacent fishing grounds that may be equally or only somewhat less productive (similar CPUE) than the fishing grounds lost to the fishing impact minimization measure; 2) redeploying fishing effort to an area of unknown productivity and operational potential, using the identical fishing gear, in an exploratory mode; 3) switching from a fishing gear that is prohibited to a fishing gear that is allowed within the EFH protection area; and 4) switching to a different target fishery in an area unaffected by fishing impact minimization measures. Each of these strategies may have operational cost implications as described below. While empirical data on operating cost structure at the vessel or plant level are not available, cost trends for key inputs may shed some light on the probable impacts of the fishing impact minimization alternatives on the industry in the aggregate and on average.

Any regulatory action that requires an operator to alter his or her fishing pattern, whether in time or space, is likely to impose additional costs on the operator. The alternative EFH protection actions would almost certainly affect the operating costs of the fishing fleets exploiting most of the marine resources in the federal waters off the coast Alaska, compared to the status quo condition. The following sections address this issue in terms of both fixed and variable costs. Fixed costs tend to arise from investment decisions and variable costs arise from short-run production decisions. As the terms imply, fixed costs are those that do not change in the short run, no matter what the level of activity. Variable costs, on the other hand, are those costs that do change directly with the level of activity, recognizing that variable inputs must be used if production exceeds zero.

As suggested earlier, many costs confronting operators in these fisheries are fixed; that is, they do not change with the level of production. Fixed costs include such expenses as debt payments, the opportunity cost of the investment in the vessel (or plant), the cost of having the vessel or plant ready to participate in the fisheries, some insurance costs, property taxes, and depreciation. Following an action that negatively affects, for example, CPUE, TAC, or catch share, these fixed costs must be distributed across a smaller volume of product output, raising the average fixed cost per unit of production. As previously noted, available information on the cost structure of operations fishing for and processing groundfish, crab, halibut, scallops, etc., is very limited. This is largely so because cost information is often considered highly proprietary by industry members and is, under the best of circumstances, expensive to collect and analyze. Only scattered anecdotal information at the operation level is available on fishing costs (fixed or variable). It is, therefore, impossible to do more than provide a qualitative discussion of the impact of the proposed fishing impact minimization alternatives on operating costs.

Of all the categories of variable factor costs, fuel ranks at or near the top of the list of operating expenses in the fisheries under consideration. Even a qualitative evaluation of the elements of the EFH protection actions (e.g., area closures) suggest that the proposed regulatory changes may likely result in the following 1) longer average trip duration to travel to remaining open fishing grounds; 2) greater total distances traveled per trip [perhaps under more extreme operating conditions]; and 3) longer periods fishing in lower CPUE areas to mitigate the potential loss of catch.

Projecting how changes in running time would affect fuel costs depends on how much fuel must be burned per unit catch. While it is not possible to place a numerical estimate on this factor, it is reasonable to conclude that, on average, total fuel consumption would increase relative to the status quo under each of the proposed alternatives. This increased fuel use would apply except in the case of vessels that cease to fish as a result of EFH restrictions, and perhaps in the case of vessels that switch to a different fishery.

What economists refer to as the opportunity cost of labor is another variable cost that may be increased by various provisions contained within any one of the measures to minimize the adverse effects of fishing on EFH. EFH measures that increase fishing time would reduce the time available for other activities, and in so doing would impose a cost on fishermen. Several of the contemplated measures may increase the time required for fishing in affected fisheries. As noted elsewhere, fishing impact minimization measures may increase transit time to and from fishing grounds; they may force fishermen to fish on grounds with lower CPUE, thus increasing the time required to harvest any given amount of fish; or they may force fishermen to learn new fishing grounds or gear, thus increasing fishing time, at least initially. Because fishing crew members are generally paid with shares of an operation's net (or modified gross) revenues, the additional time spent at sea as a result of these measures may actually decrease crew earnings if the operating expenses of the fishing vessel increase.

This opportunity cost is also reflected in lost time, which reduces the individual's opportunities to engage in other activities and is treated as a cost in economic benefit/cost analysis. The limitations of available models for predicting how fishing operations would behave, given the constraints, and the limited amount of cost information available for fishing operations, makes it impossible to make quantitative estimates of the change in fishing hours or days associated with these alternatives, or to make monetary estimates of the changes in associated opportunity costs.

It has been suggested by some in the industry that fishing costs may increase so much, as a result of the provisions contained in one or another of the EFH alternative actions, that fishermen would not be able to completely harvest the TACs, or GHL, for some target species, at least in some areas. The loss of the revenues in these instances has been discussed above and is detailed in Section 3.5. On the cost side, those revenue losses may be offset, to an unknown extent, by associated reductions in the variable operating costs these operations would otherwise have incurred. From the operator's perspective, for example, fewer days fishing as a result of EFH restrictions would mean reductions in variable costs (e.g., stores, bait, lubricants and fuel expense), reduced wear and tear on vessels and gear, and reduced processing, packaging, and storage expenses for the product. It would also mean reduced payments to labor (although the other side of that coin reflects foregone wages to the skipper and crew, as well as the social value of other goods and services the fishermen might have produced).

On the other hand, the cost of fishing would tend to increase for the fish that continue to be caught. Based on information provided by the industry at public meetings and through individual contacts, as well as the professional judgement of the preparers of this RIR, seven categories of costs were defined for consideration, as follows:

- Increased travel costs
- Costs of learning new grounds or using new gear
- Costs of bycatch avoidance measures, or (if these efforts are unsuccessful) premature closure due to excessive bycatch
- Reduced CPUE due to less concentrated target stocks;
- Potential gear conflicts
- Effects on processors built for higher throughput
- Safety impacts (addressed separately below in Section 3.1.2.4)

Increased Travel Costs: Vessels that had formerly been able to fish areas nearer shore, and in relative proximity to their preferred port of operation, could be pushed farther offshore and/or into more remote fishing areas, as a result of specific provisions contained in EFH alternatives under consideration by the Council. Running to one of the remaining open fishing areas, prospecting for harvestable concentrations of target species, then (depending on operating mode) running back to port with raw catch or product would, as previously noted, require increased expenditures of fuel and other consumable inputs, as well as more time on the water (i.e., trips may be longer, and all variable operating costs and wear and tear on equipment and crew would increase). These changes in fleet operating patterns would likely require a greater total number of days for a given vessel to take its share of the available TAC or GHL, other things being equal.

How many additional days may be required would vary by stock and ocean conditions, rates of success in locating fishable concentrations of the target species in remaining open areas or time periods, operational mode and capacity, the level of aggregate effort exerted by the fleet or sub-sector in the remaining open areas, etc. But clearly, if catch per unit effort declines, cost per unit of catch would increase. In the limit, smaller vessels may be so disadvantaged by the distances that must be traversed between port and open fishing grounds that they may be unable to operate economically (perhaps, even physically) under these circumstances.

While empirical data on operating costs currently are not available for any of the sectors that may be impacted by the proposed alternatives to the status quo, it appears certain that travel costs would increase due to rules prohibiting transit of specific areas by any vessel (e.g., SSL critical habitat RPAs) or other forms of exclusionary rules that might be attributed to one or another of the EFH action alternatives. In the limit, smaller vessels may be so disadvantaged by the distances that must be traversed between port and open fishing grounds, when intervening areas are closed to transit or otherwise restricted, that they may be unable to operate economically (and perhaps even physically) under these circumstances. These vessels could be effectively closed out of the fishery. The probability of occurrence, resulting magnitude, and distribution of such adverse effects cannot be estimated, based on deductive reasoning.

Even vessels with the physical capacity to circumnavigate no transit and/or restricted access zones to reach open fishing grounds may incur prohibitively high operating costs (e.g., excessive fuel consumption), increased risk (e.g., should sea or weather conditions change unexpectedly), and reduced product quality (i.e., as hold-time increases). Anecdotal reports offered at the December 2000 Council meeting (specific to the SSL EIS RPA open, closed, and no-transit zones) suggested that, in some cases, a vessel wishing to participate in a commercial opening might have to sail from port to one open area, then (depending on success, available quota, etc.) have to retrace its route back to the vicinity of the original point of departure before sailing to an alternative open area, even though a much shorter direct route was available through a designated no-transit zone (SSL EIS RPA). This same outcome could accompany any restricted access provisions associated with EFH closures. In an open access fishery, especially, the old adage "time is money" is fundamentally true; thus, longer distances and increased time in transit mean higher operating costs, less time fishing, and greater exposure to economic and physical risk.

<u>Costs of Learning New Grounds or Using New Gear</u>: It is axiomatic that fishermen fish when and where they believe the fish are most valuable and most readily available. Under provisions of the suite of EFH measures under consideration by the Council, open and closed areas would compel operators to alter the pattern of operations they would voluntarily choose to undertake as profit maximizing entities. That is, in many instances, fishermen would be required to fish on grounds with which they may be unfamiliar. Fishermen would face a learning curve on these new grounds. They would have to become accustomed to a new physical geography underwater and perhaps more extreme and/or exposed sea surface conditions; to new fish locations, behaviors, and habits; and to new patterns of bycatch.

While fishermen learn to operate within these new parameters, they would likely incur increased operating costs. Gear could be more frequently lost or damaged, CPUE would likely be lower, and bycatch of other species could be higher. Higher bycatch could force early closures of fishing grounds, and with fewer optional open areas available, it would be more difficult (and, thus, more costly) for operators to voluntarily move off hot spots to reduce or avoid bycatch.

Even if the bycatch is composed of species for which there is no potential risk of regulatory closure, the additional resources (e.g., time and labor) required to land, sort, and discard unwanted catch would increase operating costs. Because, in many instances, large volumes of fish would have to be taken in places and at times when they have never been taken before, there is little available information for fishermen to use to make inferences about these issues in advance of committing the effort. Thus, they would have very little opportunity to avoid incurring the costs of prospecting new areas (at new times) even if, subsequently, the effort proved uneconomical from the standpoint of catch success.

Under some EFH provisions, vessels would be precluded from fishing an area with the gear they have traditionally used (e.g., NPT GOA slope rockfish). They would, however, be permitted the option under these alternatives of changing over to authorized gear and continuing to participate in the fishery. This opportunity carries with it several implications for the operational and capital cost structure (and, thus, economic viability) of any such operation. The first consideration would be, "Does this provision represent a meaningful opportunity for, and a real accommodation of, the vessels in question?" A cursory examination of the potentially affected fleets suggests that many vessels are too small and/or haven't sufficient horsepower (and likely insufficient revenues from the fishery from which they are being displaced) to make this gear change. For these vessels, the provision does not represent a viable option.

Even for those operations that have the physical and financial capability to undertake the gear changeover, there are several significant economic and logistical barriers to overcome. Perhaps the most obvious would be the potentially significant up-front cost of acquiring the new gear (e.g., longlines, PTR). In addition, there could be (perhaps substantial) costs associated with modifying and adapting the current vessel to efficiently use the gear type (e.g., booms, davits, winches, hydraulics). The conversion costs may include both cash outlays, as well as foreign fishing revenue attributable to down time to complete the transformation. For some operators, obtaining necessary shipyard services could involve the additional time and expense of moving the vessel to a distant port where necessary facilities exist (e.g., Seattle-Tacoma).

Finally, prosecuting a fishery with unfamiliar gear may demand different crew skill-sets, perhaps a different (larger? smaller?) crew. Whether skilled crewmembers can be readily recruited to fill these needs, or whether some or all of the existing crew can be retrained and employed, could be key to a successful, economically viable transition. Recruiting, retaining, and/or retraining a professional fishing crew would impose costs of various types on these operations. While not readily amenable to quantification, these represent very real potential costs.

<u>Costs of Bycatch Avoidance Measures</u>: While the selectivity of the gear fished for these target species varies, groundfish fishermen unavoidably take other species as incidental catch when they fish for most target species. In some instances (e.g., bycatches of halibut, salmon, herring, and some species of crabs), groundfish fishermen are subject to limitations on the amounts of bycatch that they may take. When the bycatch limits (or caps) are reached, the fishery is closed. Fishermen can, to a greater or lesser degree, reduce bycatch by modifying their gear or the way they use it, and by learning the times and places when unacceptably large bycatches might take place (Queirolo et al. 1995). Both bycatches and the avoidance measures that they make necessary impose costs on the operations. Finally, with temporal and geographic dispersion provisions associated with some of the EFH fishing impact minimization measures, there is the potential for increased interactions with protected species (e.g., short-tailed albatross, ESA-listed PNW Chinook salmon), which could require Section 7 consultation (with the potential to trigger further and more extensive fishing closures).

Reduced CPUE Due to Less Concentrated Target Stocks: The economic, operational, and socioeconomic response of individual operators may take several forms following adoption of a specific EFH fishing impact minimization action. For example, anecdotal information supplied by the industry in public meetings and through individual contacts suggests that CPUE may decline, in some cases substantially, as a result of significant fishing effort being forced into unfamiliar or unfavorable areas. The effect of these declines would not likely be uniformly distributed across each management area, gear type, processing mode, or vessel size category and, thus, would carry with them very different implications for profitability, economic viability, and sustained participation in these fisheries.

Potential Gear Conflicts: Concerns have been expressed, from a variety of sources, about the adverse economic effects associated with forcing gear-specific effort out of traditional operating areas and into proximity with other gear groups and/or target fisheries. Trawl gear, pot gear, and longline gear are incompatible when fished simultaneously in a given area. Gear damage or loss is a common outcome when these competing fishing technologies come into contact with one another on the fishing grounds. Each gear group perceives itself as facing unique operating challenges with respect to such conflicts. For example, Pacific cod longline fisheries occur north of the Pribilof Islands at the same time that bottom trawl fisheries target flathead, yellowfin, and rock sole in the same area. By voluntarily isolating themselves in well defined and generally recognized areas, they insulate themselves from the high cost and frustration associated with gear conflicts (loss of longline gear and catch). Bottom trawl fishing area closures being considered under several of the EFH alternatives (Alternatives 4 and 5) would affect significant areas within the accustomed EBS flatfish fishing grounds and could force the bottom trawl effort onto fishing grounds typically used by longline fishermen targeting Pacific cod.

Effects on Processors Built for Higher Throughput: If CPUEs decline and fishing is more geographically dispersed under some alternatives, the aggregate rate of catch could slow. This implies that the rate of delivery to processors would also decline. Because existing processing plant capacity has been built, in many cases, for peak through-put (i.e., to maximize the rate at which catch is received and processed in response to the race-for-fish on the grounds), lower and slower deliveries may not supply sufficient quantities of raw fish for plants to operate profitably. Many plants have been designed, configured, and operated to exploit economies-of-scale in production. They are designed to move an optimal volume of fish through the processing plant at the most efficient, most cost effective rate, given the capacity of the facility and expectations of catch and delivery rates from the catcher-vessel fleet. If operated at rates that significantly deviate from those for which the plant was designed, these economies would be lost, and a plant could become unprofitable to operate.

The nature of these interactive and compounding relationships is important to keep in mind. None of these economic, operational, or logistical elements works in isolation from one another.

C.3.1.2.4 Safety Impacts

Commercial fishing is a dangerous occupation. Lincoln and Conway, of the National Institute of Occupational Safety and Health (NIOSH), estimate that, from 1991 to 1998, the occupational fatality rate in commercial fishing off Alaska was 116 persons per 100,000 full time equivalent jobs, or about 26 times the national average of 4.4/100,000 (Lincoln and Conway 1999). Fatality rates were highest for the EBS crab fisheries. Groundfish fishing fatality rates, at about 46/100,000, were the lowest of the major fisheries identified by Lincoln and Conway. Even this relatively lower rate was about ten times the national average (Lincoln and Conway 1999).

During most of the 1990s, commercial fishing appeared to become relatively safer. While annual vessel accident rates remained comparatively stable, annual fatality per incident rates (case fatality rates) dropped. The result was an apparent decline in the annual occupational fatality rate. From 1991 to 1994, the case fatality rate averaged 17.5 percent per year; from 1995 to 1998 the rate averaged 7.25 percent per year. Lincoln and Conway report that, "The reduction of deaths related to fishing since 1991 has been associated primarily with events that involve a vessel operating in any type of fishery other than crab." (Lincoln and Conway 1999, page 693.) Lincoln and Conway described their view of the source of the improvement in the following quotation. "The impressive progress made during the 1990s, in reducing mortality from incidents related to fishing in Alaska, has occurred largely by reducing deaths after an event has occurred, primarily by keeping fishermen who have evacuated capsized (sic.) or sinking vessels afloat and warm (using immersion suits and life rafts), and by being able to locate them readily, through electronic position indicating radio beacons" (Lincoln and Conway 1999, page 694).

There could be many explanations for this improvement. Lincoln and Conway point to improvements in gear and training, flowing from provisions of the Commercial Fishing Industry Vessel Safety Act of 1988 that were implemented in the early 1990s. Other causes may be improvements in technology and in fisheries management. Technological improvements may include advances in Emergency Position Indicating Radio Beacon (EPIRB, sometimes also called an ELT or Emergency Locator Beacon) technology. Current 406 MHz EPIRBs are more effective as a means of communicating distress than the 121.5 MHz EPIRBs in use in the early 1990s, in that they now transmit a unique identification code in addition to position information, which allows USCG personnel ashore to quickly identify the vessel, use point of contact telephone numbers, and more effectively filter out false alarms.

Fishery management changes have included the introduction of individual quotas for halibut and sablefish, actions that have dramatically slowed the historically frenetic pace of these fisheries. The introduction of co-ops in the pollock fisheries in 1999 and 2000 is not reflected in these statistics. Rationalization of the pollock fishery in the BSAI, however, may have furthered safety improvements. The Lincoln-Conway study implies that safety can be affected by management changes that affect the vulnerability of fishing boats, and thus the number of incidents, and by management changes that affect the case fatality rate. These may include changes that affect the speed of response by other vessels and the USCG. Starting in 1997, the United States Coast Guard's (Coast Guard) Seventeenth District instituted a practice of forward deploying a long range search helicopter to Cold Bay, Alaska, to improve agency response time during the Bristol Bay red king crab fishery. This practice was expanded in 1998 to cover the opilio crab fishery. In 1999, approximately 11 lives were saved, in a 6-day period of extreme weather, when the forward deployed helicopter responded to several vessel sinkings and other marine casualties in short order.

In this RIR, several safety-related issues have been considered with respect to the EFH alternatives. These include the following:

1. Fishing farther offshore
2. Reduced profitability
3. Changes in risk

<u>Fishing Farther Offshore</u>: Changes in fishery management regulations that result in vessels, particularly smaller vessels, operating farther offshore appear likely to increase the risk of property loss, injury to crew members, and loss of life. Fishing impact minimization measures that close nearshore areas to fishing operations, such as closures to bottom contact fishing in Prince William Sound and around the Pribilof Islands (Alternative 6), could compel vessel operators to choose between assuming these

increased risks or exiting these fisheries entirely. Weather and ocean conditions, especially in the BSAI, but also in the GOA, are among the most extreme in the world. The region is remote and sparsely populated, with relatively few developed ports. The commercial fisheries are conducted over vast geographic areas. While many vessels in these fisheries are large and technologically sophisticated, many more are relatively small vessels with limited operational ranges.

Several factors associated with fishing farther from shore can reduce the safety of fishing operations by increasing the likelihood of emergency incidents. Vessels would probably have to spend more time at sea in order to take a given amount of fish. It would take more time to travel between port and the remaining open fishing grounds. Operators would also be likely to be fishing in less familiar conditions and on stocks that may be less highly aggregated, thus reducing CPUE. Increases in the time spent at sea increase the length of time fishermen are potentially exposed to accidents. Furthermore, longer trips are likely to increase fatigue and thus the potential for mistakes and accidents.

Other factors may tend to increase the case fatality rate. Fishing vessels may be farther from help if an accident occurs. In many cases, the initial response to trouble comes from other fishermen. If fishing farther offshore, on more extensive fishing grounds, increases the dispersion of the fishing fleet, assistance from other fishermen may not be as readily available. In addition, regulatory actions that force fishing vessels to work farther offshore may turn what would normally have been a request for assistance search and rescue (SAR) case into an emergency or life threatening situation. Many SAR cases involving fatalities start as a casualty to the vessel that degrades its stability or survivability, but does not immediately threaten the vessel or crew. After the initial casualty, other environmental factors (e.g., heavy seas, winds, freezing spray, etc.) may quickly cause the situation to deteriorate. The ability to render assistance early is essential. Vessels fishing farther from shore and/or in more remote and exposed locations may experience additional delays before help can arrive.

In a similar respect, the ability to satisfactorily treat personnel injuries is often determined by the speed with which the injured can receive adequate medical attention. While these factors may affect all operations, they are likely to be most serious for the smaller vessels based in Alaska ports, which have tended to fish relatively close to the shore in the past. For example, it is reported that small vessels operating out of Kodiak or Alaska Peninsula communities typically seek at least 48 hours of stable weather to initiate a typical fishing trip. This 48-hour window of opportunity allows a run from port, time spent fishing, and time for returning to port. The weather window is often attainable between the steady series of low pressure system storms that pass through the region from west to east at all times of the year, although with greater frequency and severity in the winter. With the combined effects of a longer run to fish in more distant waters, plus longer fishing times caused by reduced catch rates, a much longer window of opportunity to conduct a fishing trip would be required. The effect of this new situation could vary. It could result in fewer trips and lowered harvest levels, because there are likely to be fewer relatively good weather periods of sufficient duration. However, as noted below, fishing vessel owners would face economic pressures on their fishing operations due to diminished revenues and increased costs. There is a reasonable likelihood for a tendency to try to squeeze longer trips into marginal weather conditions, with disastrous consequences for some. Fishing impact minimization measures that induce such fishing patterns would almost certainly lead to an increased level of risk to vessels and crews, albeit an increase that cannot be empirically estimated.

Reduced Profitability: As discussed throughout this RIR, proposed restrictions on fishing to protect EFH could reduce the profitability of many operations, especially including many of the smaller operations. Reduced profitability could be an indirect cause of higher accident rates. For example, fishermen facing a profit squeeze could defer needed maintenance on vessels and equipment, reduce operating costs by cutting back on safety expenditures, or scale back the size of their crew in order to reduce crew share expenses. Remaining crew would have expanded responsibilities and could risk greater fatigue, increasing the likelihood of accidents. Finally, these operators could decide to fish more aggressively, even in marginal conditions, in an effort to recoup lost revenues. These factors may affect the incident rate and the case fatality rate, as well.

Changes in Risk: Each of the factors described above increase risk. On the other hand, the potential for increased risk may be offset to some extent by changes in fleet behavior. An increase in risk effectively increases the cost of each additional day of fishing that, in turn, may contribute to reduced levels of participation (e.g., fewer fishing days) by smaller vessels. If this leads to a safety-induced reallocation of harvest from smaller to larger vessels, risk calculations may be affected. Similarly, smaller crew sizes mean that fewer people on a vessel are exposed to danger. Furthermore, skippers who have less invested in safety gear may have an incentive to behave more cautiously or conservatively in other respects in order to offset some of this perceived increased risk. Very little is known about factors that might increase risk, or that might offset risk increases, for fishermen in the North Pacific and EBS. Even the best estimates of statistics as fundamental as the occupational fatality rate are not precise, and are not available at all for recent years. Rough estimates of the relative ranking of occupational fatality rates in different fisheries are known. Little more than qualitative speculation is available concerning the factors that affect the rates in the different fisheries, however. Available information does not permit quantitative modeling of changes in these rates in response to changes in fishery management regulations that could be induced by fishing impact minimization measures. These changes in fishing behavior and patterns could lead to an increased level of risk to vessels and crews, albeit an increase that cannot be empirically estimated.

Specific to the last point, proposed EFH closures (especially when combined with prevailing Steller sea lion closed areas and no-transit zones) that restrict access to nearshore areas could compel vessel operators to choose between assuming increased risks or exiting these fisheries for some or all of the fishing season.

Weather and ocean conditions in the BSAI and the GOA are among the most extreme in the world. The region is remote, sparsely populated, has relatively few developed ports, and the groundfish fisheries are conducted over vast geographic areas. While these factors may affect all operations, they are likely to be most serious for the smaller vessels, based in Alaska ports, that have historically tended to fish relatively close to shore. For example, it is reported that small vessels operating out of Kodiak or Alaska Peninsula communities typically seek at least 48 hours of stable weather to initiate a Pacific cod trip. This 48-hour window of opportunity allows a run from port to the grounds, fishing time, and time for returning to port. The weather window is often attainable between the steady series of low pressure system storms that pass through the region from west to east the entire year. With the combined effects of a longer run to fish in more distant open grounds, perhaps complicated by no transit or other passage restrictions, longer fishing times caused by reduced catch rates, the need to prospect unfamiliar territory, and a run back to port from those more remote grounds (again skirting any restricted transit areas) a much longer window of opportunity may be needed to conduct a fishing trip.

These operational and economic impacts may vary by target, vessel size, port/region, and operational mode. In some instances, the effect may be fewer trips and lower harvest levels for smaller vessel operators because enough periods of good weather are unlikely. Vessel owners may face mounting economic pressures due to diminished revenues and increased costs. There is a reasonable likelihood that some will try to squeeze longer trips into marginal weather conditions. The result of this new fishing pattern will be an increased level of risk to vessels and crews.

Each of the economic and operational factors affecting access to or transit through particular areas , and described here and elsewhere in the RIR, increases risk. If this leads to a safety-induced reallocation of harvest from smaller to larger vessels, fleet-wide risk calculations may be affected. That is, the fewer small, potentially more vulnerable, vessels operating in a given fishery, the less the aggregate risk to the fishing fleet on the grounds. While any such reallocation is primarily distributive in nature (i.e., does not result in a change in net economic benefits or costs), it would have direct implications for many of the other objectives associated with the proposed action alternatives identified by the Council (e.g., equity among historically participating segments of the industry, community stability and welfare concerns, and avoidance of excessive shares by a small number of operators).

C.3.1.2.5 Impacts on Related Fisheries

Direct changes to a fishery, induced by fishing impact minimization measures, could have indirect and unanticipated impacts on other fisheries beyond the gear conflict issue addressed earlier. Some of these impacts could impose (perhaps substantial) costs on these other fisheries. The following costs have been considered in this RIR:

- Displacing capacity and effort
- Compression/overlapping of fishing season
- Increased costs of gearing up and standing down

Displacing Capacity and Effort: While AFA sideboard provisions and LLP constraints seek to manage and control transference of effort and capacity across fisheries, they are not absolute barriers to this phenomenon. Should EFH closures, gear restrictions, TACs (or area apportionments thereof) be too constraining to support existing levels of effort, it is possible that effectively displaced capacity would redistribute to remaining open target fisheries, imposing potentially significant costs on the operations that currently prosecute them.

As previously recognized, operations in any given fishery or sub-sector are not homogeneous in capacity and capability. Therefore, should EFH measures induce movement of capacity and effort from one fishery to others, it is likely that the greatest economic and operational burden would fall upon the smallest, least operationally diversified, and least mobile elements of these fleets. Given these smaller operations' inherent physical limitations (e.g., operational range, catch holding capacity, speed and sea worthiness) it is likely that these would be the first casualties of any effort and capacity transference. Because these operations are most likely to be home ported in small communities along the GOA and BSAI coast, the relative magnitude of such displacement on these local and regional economies would be disproportionately greater, as well.

Compression/Overlapping of Fishing Season: Many of the larger operations in the EBS, and even Aleutians' and Gulf fishing fleets, are highly specialized (e.g., AFA surimi C/Ps). Many others, however, rely upon diversification (i.e., fishing a sequential series of different target fisheries over the course of the year) to sustain an economically viable operation. Communities have developed around, and invested in facilities and infrastructure to support, these fishery participation patterns. The classic Alaska example has come to be the 58-foot Limit Seiner. This class of commercial fishing vessel was specifically designed to meet the State of Alaska's regulatory limit (i.e., maximum 58 feet LOA) for participation in the salmon seine fishery. Over time, these, as well as many other, small boats have evolved patterns of operation that include participation in fisheries for (among others) crab, halibut, and various combinations of groundfish species.

Because these operations are economically dependent on participation in a suite of fisheries, anything that alters their ability to move sequentially from fishery opening to fishery opening places them at economic risk. For example, should the Council select an EFH fishing impact minimization action that results in temporal displacement of fisheries (either directly or indirectly), placing fishery openings in conflict, it could reduce the economic viability of some fishing operations. They could find themselves in the position of choosing to participate in only one fishery, among two or more alternative openings, and foregoing participation in the others. It may not be possible, under these circumstances, for such an operation to remain economically viable in the long run. Besides losing the revenues from participation in fisheries that overlap, these operations could find themselves idled during portions of the year when weather and sea conditions would otherwise permit fishing operations. This could have unintended consequences, such as difficulty retaining a professional crew and smaller gross revenues over which to spread fixed costs. It could also mean lost wages to the community.

The ultimate loss of a significant number of these operations could have profoundly negative economic and social impacts, not only on the EFH-regulated fisheries but also on the commercial sectors of other economically important regional fisheries (e.g., salmon, herring).

There could be an analogous concern about the inshore processing sector. Processing plants often are equally dependent on the predictable sequential prosecution of fisheries during their operating year. Many plants in Alaska are specifically designed and configured to take advantage of efficiencies attributable to a consistent seasonal sequence of species delivered for processing. Crews are hired, maintained, or let go, as needed, based on expected demand for processing services. Likewise, start-up, maintenance, and shut-down costs are predicated on the timing and duration of fishery openings, as are logistical and staging costs to assure production inputs are in place when needed, and outputs reach markets on time.

In connection with the prospect of temporal season changes attributable to Steller sea lion RPA restrictions, some owners of processing capacity have suggested, in testimony before the Council, that they would be forced to consider not opening their plants because of uncertainty about the timing and duration of fisheries. If some plants fail to open on schedule, fishermen who otherwise would have participated in a fishery may have no market for their catch. This may be particularly significant for small catcher boats operating in relatively remote areas of the state. Furthermore, these effects need not necessarily accrue only, nor even substantially, to fisheries for FMP-managed EFH-affected species. In some areas, processors are able to provide markets for, say, salmon, only because they can underwrite some of their fixed staging costs by keeping their operations employed over an extended season with deliveries of crab, halibut, groundfish, etc. (John Garner, NORQUEST Seafoods, per. comm. 2003). The extent to which these potential adverse effects are actually realized cannot be assessed at this time. Nonetheless, they represent potentially significant sources of economic disruption for these sectors of the industry, and the coastal communities dependent upon them.

Increased Costs of Gearing Up and Standing Down: Logistical and staging costs can represent a significant expense for many operations participating in the fisheries of the BSAI and GOA due to the remoteness of the fisheries. Should one or more of the fishing impact minimization measures result in temporal displacement of fisheries (as several have the potential to do), there would be adverse economic and operational impacts on vessels, plants, and crews that could not be readily avoided or compensated for. That is, if an EFH-restriction results in, for example, an accelerated rate of PSC bycatch caused by concentrating effort within the remaining open areas, fisheries could be prematurely closed until additional PSC quota was scheduled to be made available. The immediate result would be an idling of the fleet and associated processing plant capacity. In effect, the fishery would be required to stand-down until the next scheduled opening. From the perspective of the fishing industry, mandatory idle periods between openings impose direct costs. The longer the duration of imposed idleness and the more numerous these periods, the greater the potential economic and operational burden.

Presumably, some form of step function exists that characterizes these potential adverse impacts. That is, it may be likely that a mandatory stand-down of 24 hours, or 48 hours, or even 72 hours, would impose costs that could be absorbed by most operators participating in the target fishery (although all would likely prefer to avoid them). Indeed, over such a relatively brief interval, an operator might keep the crew productively employed with maintenance and/or other forms of preparation for the anticipated re-opening. Nonetheless, the plant or vessel must continue to pay its variable costs (e.g., wages and salaries, food and housing expenses, fuel and other consumable input costs, etc.) during the stand-down while producing no marketable output, and therefore earning no revenues.

Under such circumstances, each operator could eventually reach a threshold, beyond which the cost of standing-by would become a significant economic burden. Precisely where this threshold lies would likely vary by operation. At present, no empirical information is available with which to predict when these thresholds might be attained by any given plant or vessel. However, if the threshold were reached, the operator would face a series of decisions with potentially significant economic costs and operational consequences.

These costs may be characterized as staging expenses. For example, transporting crews by air to and from remote Alaska locations multiple times in a fishing year (rather than once or twice, as has historically been required) would represent a significant additional operating expense. In association with analysis of the EBS Pollock/Steller RPA analysis undertaken in late 1999 and early 2000, the At-sea Processors Association reported that each C/P that participates in the pollock target fishery carries a crew of 100 to 125. Motherships and inshore plants in that same fishery have at least as many transient employees. The Atka mackerel and Pacific cod target fisheries in both the BSAI and GOA, as well as the GOA pollock fishery, operate at a smaller scale, per operation, and thus have fewer employees per vessel, However, the total number of participating operations is vastly larger than in the aforementioned EBS pollock fishery. Repeated movement of crew to and from staging areas in remote Alaska ports in response to stand-down periods, on the scale suggested by these estimates, would represent a potentially significant economic and logistical burden for these fleets and plants.

Similarly, moving fishing supplies and support materials to and from the vessel's staging port or onshore plant location two or more times each season, as well as providing for secure stand-down status of the vessel or plant and its equipment between openings, could impose considerably higher operating costs, and thus smaller profit margins. Moorage slips, especially for the larger vessels in these fleets, may be in short supply, given the limited physical facilities that currently exist in ports and harbors adjacent to the EFH-affected fishing areas. If entire fleets must lay-up for weeks or even longer periods between openings, existing moorage facilities could be overwhelmed. Even if adequate space could be found, it is probable that rental/leasing costs for that space would be bid up significantly. In the long run, this induced demand could result in investment in additional port and harbor facilities. Should subsequent changes in fishing patterns occur that substantially reduced demand for transient stand-down moorage, some or all of these investments could be stranded (that is, they would become excess capacity).

As suggested above, inshore processors may experience equivalent logistical costs, depending upon their relative level of operational diversification, geographic location, length of current operating season, etc. Presumably, there exists a balance-point between the minimum necessary volume of deliveries of catch to a plant, the duration of idleness between delivery flows, and the ability to operate a processing facility at all. While likely varying from plant to plant, operator to operator, and even species to species delivered, it is clear that if a plant cannot cover its variable operating costs, it is better off (from an economic perspective) to cease operation altogether. As staging costs (e.g., moving crews and supplies to and from the facility) increase, this operating margin shrinks. Data limitations preclude estimating which plants can or would choose to operate under these circumstances. It is apparent, however, that significant temporal changes in fishery openings and/or duration (as implicitly or explicitly provided for under several of the proposed fishing impact minimization alternatives) would increase the likelihood that some may not continue to operate.

C.3.1.2.6 Costs to Consumers

Ultimately, fish are harvested, processed, and delivered to market because consumers place a value on the fish that is over and above what they have to pay to buy them. A person who buys something would often have been willing to pay more than they actually did for the good. The difference between what they would have been willing to pay and what they had to pay is treated, by economists, as an approximation of the value of the good or service to consumers (i.e., consumer's surplus) and as one component of its social value. If the price of the good rises, the size of this benefit will be reduced, all else equal. If the amount of the good available for consumption is reduced, the size of this benefit is also reduced. Provisions of the proposed EFH actions could reduce the value consumers of seafood (and associated fish products) receive from the fisheries for several reasons, including 1) consumers may be supplied fewer fish products; 2) consumers may have to pay a higher price for the products they do consume; and 3) the quality of fish supplied by the fishing industry may be reduced and, thus, the value consumers place on (and receive from) them will decline.

The domestic consumer losses would fall into two parts. One part, corresponding to the loss of benefits from fish products that are no longer produced, would be a total loss to society. This is often referred to as a deadweight loss. The second part, corresponding to a reduction in consumer benefits because consumers have to pay higher prices for the fish they continue to buy, would be offset by a corresponding increase in revenues to industry (i.e., producers' surplus gains). While a loss to consumers, this is not a loss to society. It is a measure of the benefit that consumers used to enjoy, but that now accrues to industry in the form of increased prices and additional revenues.

The actual loss to society cannot be measured with current information about the fisheries. Estimation would require better empirical information about domestic consumption of the different fish species and products, and information about the responsiveness of consumers to the reduction in the supply (e.g., their willingness and ability to substitute other available sources of protein). In addition in the present case, because, under the status quo, society is already in a suboptimal state (i.e., incurring a welfare loss associated with the externalities imposed by destruction and/or degradation of EFH), actions taken to reduce these externalities (i.e., minimizing fishing impacts on EFH) will result in an aggregate welfare improvement to society, offsetting any apparent welfare reduction in the retail/wholesale domestic seafood/fish products commercial marketplace (i.e., no deadweight loss is incurred).

C.3.1.2.7 Management and Enforcement Costs

Management and enforcement considerations, as they pertain to groundfish fisheries in the EEZ off Alaska, are treated at length in Section 4.3. of the EFH SEIS. The reader is referred to that section for detailed discussions. In terms of both management and enforcement costs, NOAA Fisheries anticipates that all of the EFH protection measure alternatives (with the exception of Alternative 1, Status Quo) would require some level of increase in staff and budget for NOAA Fisheries Enforcement and the

In-Season Management Branch of the Alaska Regional Office's Sustainable Fisheries Division. The alternatives would all require increased enforcement of complex closed areas, directed fisheries, and gear modification/restrictions.

Although the alternatives would affect fishery monitoring efforts of the Coast Guard, as well, that agency has consistently reported that it considers all activities to support the commercial fisheries off Alaska as part of a national budget and does not estimate additional costs associated with these alternatives. That is to say, the Coast Guard has a long standing commitment to enforce, to the best of its ability, any fishery regulation the NPFMC proposes and NOAA approves and to do so within existing budgetary and resource constraints. Because Coast Guard resource levels can generally be regarded as fixed, within the federal budget cycle, this aspect of the analysis will focus on the type and effectiveness of enforcement support, in lieu of any dollar value, associated with increased enforcement impacts for the various alternatives. With very little likelihood of receiving additional resources to enforce new fishery regulations, resources will be reprioritized to take into account all existing regulations. In the case of EFH fishery impact minimization regulations, this may require resource allocations that would draw enforcement resources away from other areas of Coast Guard responsibility.

This Coast Guard input to the EFH RIR seeks to clarify the expected enforcement costs (i.e., tradeoffs) of the various fishery impact minimization alternatives, found within the proposed EFH action, relative to each other. The criteria used to describe resource allocation requirements and enforcement effectiveness do not allow meaningful comparative analysis of the alternatives without breaking the alternatives into smaller categories, instead of comparing intact alternatives to each other. Therefore, the Coast Guard divided the alternatives into three distinct sub-alternatives, by area, for purpose of the following assessment: AI, EBS, and GOA. This analysis examines the resource requirements as the subalternatives are presented in the EFH EIS. Should VMS or other management measures be added to any of the subalternatives, the resource requirements for those subalternatives could increase or decrease dramatically and the overall ranking of the subalternatives would likely change.

As a general rule of thumb, any regulation that includes a total closure and does not differentiate between gear types is reasonably enforceable using aircraft and, therefore, relatively less resource intensive. Any closure that requires Coast Guard cutters to actively patrol (e.g., bottom trawl or species specific closures), vice aircraft, will require relatively more resources to enforce. The use of the straight-line closures, parallel to latitude and longitude lines, can be more effectively monitored and enforced. This is in contrast to contour line closures that would be impractical to effectively enforce, either from Coast Guard aircraft or cutters and would, therefore, require more patrol time to accurately identify and plot violations of closure areas.

On the basis of the proposed alternatives, as specified in the EFH fishing impact minimization action, the Coast Guard projects the following, with regard to complexity and cost of enforcement:

Alternative 1 (Status Quo/No Action)
No additional reallocation of assets necessary.

Gulf of Alaska subalternatives ranked from least resource intensive, to most resource intensive:

1. Alternative 6

   Alternative 6 for the GOA would be reasonably enforceable with the use of Coast Guard aircraft due to the nature of the closure and the relatively straight lines used to draw the closure areas.

2. Alternatives 2 and 4

   Alternatives 2 and 4 for the GOA are identical and are, therefore, considered as one. These alternatives would be more resource-intensive to enforce, due to the type of closure employed. Because the closures would be gear-specific and species-specific, the use of Coast Guard cutters would be required to conduct at-sea boardings to verify compliance. The use of straight lines to draw the closure areas would, however, allow for more effective monitoring and enforcement than contour lines.

3. Alternative 3

   Alternative 3 for the GOA would require more resources to enforce than Alternatives 2, 4, or 6, due to the complexity of the closure lines and the vast linear area included in the closure. This alternative is also based upon gear and target species restrictions, which would require the use of Coast Guard cutters to enforce. Effectiveness of at-sea enforcement of this alternative would be diminished, due to the use of contour lines for the closure boundaries, which adds complexity to the positioning accuracy necessary for compliance and enforcement and may require more patrol time for cutters.

4. Alternative 5A and 5B

   Alternatives 5A and 5B for the GOA would require the most resources to effectively enforce, due to the reasons outlined in describing Alternative 3 above and the fact that there are additional closures to those found in Alternative 3. Because both types of closures found in Alternatives 5A and 5B require gear specific restrictions, at-sea enforcement would require the use of Coast Guard cutters to support boardings to verify compliance.

Bering Sea sub-alternatives ranked from least resource intensive, to most resource intensive:

1. Alternative 6

   Alternative 6, for the EBS, would require the least resources to enforce, due to the complete closure of designated areas (not gear- or species-specific), the general use of straight closure lines, and the ability of Coast Guard aircraft to patrol these areas going to and coming from the United States/Russia Maritime Boundary Line.

2. Alternatives 5A and 5B

   Alternatives 5A and 5B, for the EBS, would require more resources to enforce, due to the increased complexity of rotating closures. There would, however, not be a dramatic difference from the enforcement resource requirements of Alternative 6, above. Any illegal fishing within the permanently closed areas would likely be found in the proximity of the open areas. Therefore, the vast expanse of ocean permanently closed to fishing would not require extensive patrols by Coast Guard cutters or aircraft.

3. Alternative 4

   Alternative 4, for the EBS, would have similar resource requirements as Alternatives 5A or 5B, with the only discernable difference being the smaller size of the rotating closures. Other than that small difference, the resource requirements would be virtually identical to those described in the paragraph above.

Aleutian Islands subalternatives ranked from least resource intensive, to most resource intensive:

1. Alternative 4

   Alternative 4 for the AI would require the least amount of resources of the AI subalternatives to enforce, due to the nature of the closures (complete closures) and the use of straight closure lines. As stated above, these features allow for enforcement using less resource intensive aircraft (instead of cutters), and the effectiveness of the enforcement will be enhanced by the straight lines used to draw the closure areas.

2. Alternative 5A

   Alternative 5A, for the AI, would require slightly more resources to enforce than Alternative 4, due only to the added complexity of having the Yunaska Island closure area and the Seguam Pass closure area close to each other and allowing fishing in the open area between. One larger closure generally requires fewer resources to enforce than two smaller closures.

3. Alternatives 5B and 6

   Alternatives 5B and 6, for the AI, would require the most resources to enforce, due to the lack of straight line closures in Alternative 6 and the complexity and proximity of the open areas to other open areas in Alternative 5B.[6] Both alternatives would allow for aircraft enforcement, but the effectiveness of that enforcement would be diminished by the factors previously noted. Due to the likelihood of any illegal fishing in a closed area to occur near the edge of an open area, these alternatives have similar resource requirements.

In addition to Coast Guard and NOAA Fisheries Enforcement, if EFH protection measures imposed in federal waters, were also imposed by the state of Alaska within state waters, there may be additional management and enforcement costs imposed on ADF&G and Alaska State Troopers. There is, at present, no information on the likelihood or the specific form of action the state of Alaska might take in connection with EFH fishing impact minimization. Therefore, no meaningful estimate of cost can be offered.

While not specifically contained in the alternatives, VMS or 100 percent onboard observer coverage are minimum requirements to effectively monitor compliance with any of the EFH protection measure alternatives.

[6] Two open areas close to each other with small closed areas between (or two closed areas in close proximity, with an open area between) make monitoring of those small closed areas difficult, because of the ability of violators to quickly enter into one of the open areas. Alternative 5B has several such open areas, bordered by small closed areas, creating a patchwork effect that makes enforcement more challenging and, therefore, more resource intensive.

Under provisions of the Steller sea lion management actions, VMS are required for trawl and hook and line catcher vessels and catcher-processors participating in the directed pollock, Pacific cod, and Atka mackerel fisheries. VMS provides real-time information on vessel location and can be useful for enforcing area closures and other elements of the fisheries management program. As described in Section 2.3.3 of the SEIS, many of the measures to protect EFH from fishing impacts depend heavily on the strict regulation of the location of fishing activities targeting many of the target fisheries in Alaska. Traditional methods of monitoring compliance with fishing regulations do not fully meet NMFS' need to monitor fishing activities, especially as envisioned under the EFH protection measure actions.

An electronic VMS is generally acknowledged to be an essential component of monitoring and management for complicated, geographically widespread fishing closures. As a result, Alternatives 2 through 6 would require expansion of VMS coverage beyond that currently imposed for Steller sea lion protection. Under these alternatives, additional vessels with a federal groundfish permit (and for some alternatives all groundfish, crab, halibut, and scallop vessels using bottom contact fishing gear) would be required to obtain, install, maintain, and operate an approved VMS at all times while operating in the EEZ off Alaska. This extension of the VMS program would impose additional fishery management costs on NMFS (sustainable fisheries in-season managers, and enforcement), as well as on the fishing industry itself.

VMS data would have to be monitored and interpreted by the Alaska Enforcement Division (AED). Currently, a VMS program manager, a VMS computer specialist, and an enforcement technician are on staff in the Regional Office to implement the existing VMS program. Because follow-up EFH investigations would be anticipated based on VMS data, AED would require two additional enforcement officers, one in Dutch Harbor and one in Kodiak. These officers would conduct dockside boardings and contacts to ensure compliance with EFH and VMS requirements, follow up on suspected violations, patrol with Coast Guard or other patrol units, and respond to observer affidavits, among other EFH-related tasks. One-time costs for training these new officers on the complexities of the VMS database and software would be required. Additional annual costs would also be incurred for office space, vehicles, and related support for these additional staff. Annual salary and personnel costs for these two officers are estimated to be $110,000, each.

Past experience with VMS regulations promulgated for monitoring of the Stellar sea lion protection areas has demonstrated the need for dockside boardings to ensure understanding and compliance with new VMS requirements among the fleet and provide outreach efforts to VMS retailers and installers to address specific regulatory and implementation concerns. If additional personnel and/or funding for monitoring of EFH protection measures were not provided, any enforcement or compliance monitoring activities in support of EFH protection measures would likely occur at the expense of (i.e., reduction of efforts in) other regulatory areas.

Under existing regulations, a significant component of the groundfish fishery is subject to observer coverage. Observer related response and support are high priorities for NOAA Enforcement. The AED maintains field staff whose primary function is to provide intake and investigative response for complaints and affidavits completed by NMFS-certified observers and compliance-related training and support to observer program personnel. To the extent that any increase in fleet-wide observer coverage were required by EFH protection measures, these increases would be expected to require increased response by AED staff. Absent field staff increases, additional dilution and reprioritization of staff response would be necessary.

Additional Private Sector VMS Costs: As noted, the extension of the VMS program would also impose costs on the fishing industry. The average cost of investment in VMS equipment is approximately $2,000 per vessel, with an additional $160 installation fee (Pers.comm. Alan Kinsolving, NOAA, 5/29/03). The VMS equipment is expected to have a functional lifespan of five years. Annual maintenance costs are minimal and transmission costs average about $5 per day.

Fishing operations could be required to pay for the VMS units, or their purchase could be subsidized with federal tax revenues. With private payment, the cost of VMS would fall upon the vessel owner/operator in the first instance. Others along the production chain could subsequently share some portion of these costs (e.g., slightly smaller crew shares). They are also likely to be passed on to consumers, at least in part, wherever possible. To the extent that some portion of the resulting production is exported, non-United States consumers would ultimately (and appropriately) share in these costs, enhancing the net benefit to the nation. If the federal government were to assume these VMS costs, the costs would, in effect, be imposed upon every United States taxpayer.

Additional Private Sector Observer Costs: Observer programs are conducted by NMFS in the groundfish fishery and by ADF&G in the crab and scallop fisheries. Under provisions of these management programs, the industry contracts directly with authorized Observer Provider companies. These firms supply observers to fishing vessel operators, as well as to shoreside plants, under contract. The fishing vessel operator pays for the observer services, as required, based upon the coverage level specified in regulation.

If the selected fishing impact minimization alternative results in additional fishing and running time as discussed above under Operating Cost Impacts (RIR Section 3.1.3), the cost of providing observer coverage would increase proportionately.

C.3.1.2.8 Impacts on Dependent Communities

Many of the communities of coastal Alaska that are adjacent to the BSAI and GOA are engaged in, and highly dependent upon, the commercial fisheries in the adjacent EEZ. The nature of engagement varies from community to community and from fishery to fishery. Some communities have fish processing facilities, others are homeport to harvest vessels, and many have both processors and harvesters. Some of the larger communities also have relatively well-developed fishing support sectors. Other communities participate in the fisheries primarily through the BSAI community development quota (CDQ) program. The engagement of CDQ communities occurs in a variety of ways, including receipt of royalties, investment in commercial fishing harvest and/or processing entities, and direct participation in commercial fishing activities through owning/operating vessels. CDQ investments in community fisheries infrastructure, training, and vessels have resulted in additional employment and income for local residents. Sixty-five CDQ communities and numerous Alaska non-CDQ communities (including Unalaska/Dutch Harbor, Sand Point, King Cove, Chignik, Cordova, Seward, Homer, Adak, Sitka, Petersburg, Yakutat, and Kodiak) are most clearly and directly engaged in and dependent upon multiple BSAI and/or GOA fisheries. In addition, Seattle, Washington (and the adjacent Puget Sound area) has a substantial and direct involvement in many of these fisheries. Harvest vessels from Oregon, especially from Newport, also account for a significant portion of the total catch in a number of the larger groundfish and crab fisheries.

Alternative 1 would not provide any additional measures to minimize the effects of fishing on EFH beyond those currently in place or planned as part of other fishery management actions. Therefore, there would be no direct short-term effect on dependent communities. In the long term, it is possible that taking no action under Alternative 1 would adversely affect the fisheries and, in turn, the dependent communities. However, there is no available information to link the effects of fishing on EFH to future production or yield of FMP species; therefore, such potential future effects cannot be demonstrated at this time. Future accumulation of knowledge and improved models should improve our ability to examine the linkages between the effects of fishing on EFH and the future production and yield of FMP species.

For the dependent Alaska communities, there are very few economic opportunities available as an alternative to commercial fishing related activities. For many of these communities (and especially the CDQ communities), unemployment is chronically high, well above the national average, and the potential for economic diversification of these largely remote, isolated, local economies is very limited. Indeed, it is this absence of economic opportunity, combined with the ebb and flow of fishery activity, that has historically resulted in a high level of transient, seasonal labor, and an unstable population base in many of the communities with processing facilities. Closure of portions of EFH areas to fishing, as provided for under virtually all of the proposed fishing impact minimization alternatives except the status quo (Alternative 1), could further reduce employment and business opportunities, especially in communities with significant investment in onshore processing capacity and fleet services, further destabilizing these rural coastal communities. From firms with direct and obvious linkages to the fisheries, such as maritime equipment purveyors, fuel pier operators, cold storage and bulk cargo transshipping firms; to local hotels, restaurants, bars, grocery stores, and commercial air carriers serving these communities, all would be affected by the structural changes in commercial fishing attributable to the fishing impact minimization measure actions. While not readily amenable to quantitative estimation at present, overall, many of these relatively isolated, rural, fishery-dependent communities would likely experience some level of loss in economic and social welfare, as reflected through a general decline in the quality-of-life for their residents. Beyond the private sector effects, local government jurisdictions would likely be adversely affected as well. Most of these coastal fishing communities rely heavily upon tax revenues associated with fishing activities, in all its myriad forms, for operating and capital funds (e.g., fish landings taxes, business and property taxes, sales taxes).

As populations adjust to structural changes associated with some of the alternatives, emigration would likely impose burdens on local social service agencies. For example, school districts depend for economic support upon state and federal revenues based upon per capita enrollment. Because few, if any, viable alternative sources of economic activity exist in most of these rural coastal Alaska communities, the prospects for mitigating any adverse impacts do not appear promising, at least in the foreseeable future.

Fishing is the economic base in many of these communities. Moreover, these communities are generally very fragile, in the sense that they do not have well-developed secondary economic sectors. The cost of doing business in these communities is high and few retail or other firms find it economically advantageous to locate in them. As a result, local residents often have no choice but to spend a large part of their incomes outside their communities. In addition, many who work in the fishing and/or processing sector in these communities are transient laborers who take a large part of their incomes home with them at the end of the season.

Anything that tends to diminish economic activity in such a setting (e.g., reduction in seafood landings, fishing activity, and associated exports) can do disproportionate harm to an already limited infrastructure in these communities. Many of these communities may become vulnerable to loss of transportation service due to disruptions in key fisheries, attributable to EFH-associated regulations. While the relationship is likely not perfectly linear, the more significant the structural change associated with the final alternative adopted (e.g., the greater the increase in revenue at risk, especially adjacent to these communities), the greater will likely be the adverse effects on community stability, social welfare, and quality of life.

Communities that support and depend upon these commercial fisheries may incur substantial adverse economic, socioeconomic, and cultural impacts as they adjust to changes in the total magnitude of fishery related activities, associated with newly imposed requirements of any selected EFH protection management regime. Because much of the economic infrastructure of rural Alaska coastal communities has developed in support of commercial fishing, secondary adverse effects on businesses that supply goods and services to the fleet would also be widespread.

Sixty-five communities in the BSAI region, organized into six non-profit groups, depend upon CDQs of groundfish and crab. These CDQs are either harvested directly by vessels belonging to the communities or contracted out to private companies. If, as expected, the fishing impact minimization alternatives being considered result in lower CPUEs and higher costs in fishing operations, the revenue from the CDQ harvests would be diminished, the value of the CDQ allocations to the member-communities would decrease, and secondary adverse impacts on community businesses would occur.

Alaska non-fishing communities could also have experienced a variety of adverse economic or social impacts related to the different alternatives. These include changes in local public revenues (e.g., where fish taxes collected within organized boroughs directly benefit fishing and non-fishing communities alike), changes in direct employment and income of local residents of non-fishing communities (e.g., where individuals serve as skippers or crew on fishing vessels from other communities), and a loss of indirect benefits derived from nearby fisheries activities (e.g., where the frequency, capacity, and cost of air passenger and cargo service [as well as the cost of surface shipping and, thus, the local cost of a wide range of goods from groceries to fuel] are influenced by the level of local transportation demand created by commercial-fishery-related activity). Whether these types of impacts would actually have been realized in Alaska non-fishing communities varies by alternative.

C.3.2 Alternative 1

Under this alternative, no additional measures would be taken at this time to minimize the effects of fishing on EFH.

C.3.2.1 Benefits Associated with Alternative 1

C.3.2.1.1 Passive-use Benefits

Under Alternative 1, fishing activities would continue to affect EFH at current levels (Table 3.2-1).

C.3.2.1.2 Use and Productivity Benefits

Alternative 1 would not provide any additional measures to minimize the effects of fishing on EFH beyond those currently in place or planned as part of other fishery management actions. With current scientific knowledge, it is not possible to predict whether future industry revenue would be placed at risk by taking no action under Alternative 1, because there is no available information to link the effects of fishing on EFH to future production or yield of FMP species. Current information and models provide highly conditional estimates of changes to general components of benthic habitats, and studies to date have identified species that may use the affected features to grow, survive, and reproduce. Even assuming accurate estimates of habitat changes, however, current information and models are insufficient to determine how much such changes detectably affect these processes for FMP fish stocks or to extend such a linkage to estimate changes in their future production or yield. Future accumulation of knowledge and improved models should improve scientists' ability to examine such linkages.

C.3.2.2 Costs Associated with Alternative 1

C.3.2.2.1 Industry Revenue at Risk[7]

There would be no short-term industry revenue at risk under Alternative 1 because there would be no additional fishing impact minimization measures put in place. Potential long-term impacts are unknown, although it is possible that a continuation of current management could lead to a diminishment of EFH, which could in turn lead to a diminished commercial fishery.

C.3.2.2.2 Product Quality and Revenue Impacts

There would be no short-term product quality and revenue impacts from Alternative 1. Potential long-term impacts are unknown, although it is possible that a continuation of current management could lead to a diminishment of EFH, which could in turn lead to a decline in product quality and reduction in fishing revenues.

C.3.2.2.3 Operating Cost Impacts

There would be no short-term operating cost impacts from Alternative 1. Potential long-term impacts are unknown, although it is possible that a continuation of current management could lead to significantly higher operating costs (e.g., continuously declining CPUE).

C.3.2.2.4 Safety Impact

There would be no safety impacts from Alternative 1.

C.3.2.2.5 Impacts on Related Fisheries

There would be no impacts on related fisheries from Alternative 1.

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[7] Revenue at risk represents an upper-bound projection of the gross value of the catch that could be foregone, assuming none of the displaced catch was subsequently made up (see footnote 2).

C.3.2.2.6 Costs to Consumers

There would be no short-term change in costs to consumers for fishery-derived products under Alternative 1. Potential long-term impacts are unknown, although it is possible that a continuation of current management could lead to a diminishment of EFH, which could in turn lead to adverse effects on consumers (e.g., higher prices, reduced availability, lower quality).

C.3.2.2.7 Management and Enforcement Costs

There would be no short-term changes in management or enforcement costs under Alternative 1. Potential long-term impacts are unknown, although it is possible that a continuation of current management could lead to a diminishment of EFH, which could in turn lead to productivity declines in FMP-managed species, a more aggressive and competitive fishing environment, and an increased need for monitoring and enforcement. It may be equally plausible that this would not be the result, if the Council chose to retain the status quo.

C.3.2.3 Distributional Impacts

C.3.2.3.1 Gross Revenue at Risk

No short-term revenue would be placed at risk under Alternative 1. Potential long-term impacts are unknown, although it is possible that a continuation of current management could lead to a diminishment of EFH, which could in turn lead to a diminished fishery and declining revenues.

C.3.2.3.2 Impacts on Dependent Communities

No short-term impacts to dependent communities are foreseen under the Status Quo alternative. Communities currently dependent on the relevant fisheries would continue to engage in fishing and related activities in the same manner as is occurring at present. Potential long-term impacts are unknown.

C.3.3 Alternative 2

This alternative would amend the GOA Groundfish FMP to prohibit the use of bottom trawls targeting rockfish in 11 designated areas of the GOA slope (200 to 1,000 m), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed gear or pelagic trawl gear. For a more detailed description of the measures imposed by Alternative 2, see EIS Section 2.3.3.

C.3.3.1 Benefits Associated with Alternative 2

C.3.3.1.1 Passive-use Benefits

Under Alternative 2, non-pelagic trawl (NPT) fishing activities targeting slope rockfish in 11 designated areas of the GOA would be eliminated. While it is not possible at this time to provide an empirical estimate of the changes in passive-use value attributable to this protection of EFH, it is assumed that Alternative 2 would yield some incremental increase in the passive-use benefit of EFH over the status quo Alternative 1 (Table 3.3-1). Alternative 2 would eliminate any further impact from NPT fishing for slope rockfish over a total of 10,228 square kilometers (sq. km) of GOA shelf and slope edge habitat, or 3.7 percent of the existing fishable area of 279,874 sq.km. in the GOA (Table 1.4-1) See EIS Sections 2.3.3 and 4.3 for details on the measures and the environmental consequences of Alternative 2.

C.3.3.1.2 Use and Productivity Benefits

Alternative 2 was designed to reduce the effects of NPT fishing for slope rockfish on EFH in the GOA beyond those measures currently in place or planned as part of other fishery management actions. Current scientific knowledge does not permit either a quantitative or qualitative assessment of the use benefits derived from minimizing the effects of fishing on EFH (Table 3.3-1). However, the assumption implicit in the amendment to the Magnuson-Stevens Act requirement to minimize effects of fishing on EFH is that doing so would result in the sustained or enhanced production from FMP species and contribute to a healthy ecosystem. As such, Alternative 2 would contribute additional measures that would further reduce the impacts of fishing on EFH.

C.3.3.2 Costs Associated with Alternative 2

C.3.3.2.1 Industry Revenue at Risk

Alternative 2, had it been in place in 2001, would have placed a total of $900,000 of gross revenue at risk in the GOA NPT slope rockfish target fisheries (including the value of retained bycatch). The revenue at risk would have been equal to 9.6 percent of the total status quo revenue of $9.36 million (Table 3.3-1).

The 11 designated EFH protection areas described under Alternative 2, are discreet and widely spaced along the GOA outer shelf and slope edge. There is substantial slope rockfish fishing area adjacent to the 11 areas designated for fishing impact minimization measures, where some or all of the revenue at risk could possibly have been mitigated by a redeployment of fishing effort. Additionally, slope rockfish are caught with pelagic trawl gear (PTR), used primarily by the larger catcher-vessel and catcher-processor fleet components (NMFS 2002d). The revenue at risk in the catcher-vessel fleet would have been very small compared with the status quo revenue, and, therefore, the revenue at risk could possibly have been mitigated by redeploying NPT fishing effort into adjacent areas not affected by the fishing impact minimization measures under Alternative 2. Although the revenue at risk in the catcher-processor fleet under Alternative 2 would have been larger than that in the catcher-vessel fleet and representsed more than 12 percent of the total status quo revenue in the catcher-processor fleet component of this fishery, catcher-processor revenue at risk might also have been capable of being mitigated by redeploying NPT fishing effort for slope rockfish to fishing areas adjacent to the areas directly affected by Alternative 2.

It is not possible to estimate the amount of the revenue at risk under Alternative 2 that could have been recovered by redeployment of fishing effort to adjacent areas, or to alternative fishing gears, without a thorough understanding of the fishing strategies that would actually have been employed by fishermen in response to the impacts imposed by Alternative 2. No such information is currently available. Indeed, it is likely that the affected fishermen, themselves, do not yet know how they would adjust to such a new management environment.

C.3.3.2.2 Product Quality and Revenue Impacts

Revenue impacts from changes in product quality could have been minimal under Alternative 2 for both catcher-vessel and catcher-processor fleet components. The small catch and revenue at risk in the catcher-vessel fleet component of the NPT slope rockfish fishery could possibly have been recovered by redeploying fishing effort to areas adjacent to the protected areas with additional time required to attain the necessary catch and deliver it to a shore-based plant for processing. Product quality would not likely have been affected in the catcher-processor fleet component, since these vessels process the catch onboard the vessel (Table 3.3-1).

C.3.3.2.3 Operating Cost Impacts

Operating cost impacts under Alternative 2 could have been minimal for the catcher-vessel fleet given the very small amount of revenue at risk for this fleet component. Operational costs for the catcher-processor fleet component might have increased due to the redeployment of fishing effort necessary to mitigate the 12.3 percent of the status quo revenue at risk for this fleet component. Fishing effort redeployed into areas adjacent to the protected areas might have had lower CPUE of slope rockfish, requiring additional fishing effort to mitigate the catch and revenue at risk. There may have been crowding externalities, as well, as effort became concentrated in remaining open areas (Table 3.3-1).

C.3.3.2.4 Safety Impact

Alternative 2 likely would not have affected safety in the catcher-vessel fleet component, given the unlikelihood of any significant changes in the operational aspects of this fleet. There could potentially have been an increase in adverse the safety impacts of Alternative 2 on the catcher-processor fleet component if additional fishing effort and time had been required to mitigate the revenue at risk for this fleet component (Table 3.3-1).

C.3.3.2.5 Impacts on Related Fisheries

Alternative 2 would have been unlikely to have had significant impacts on related fisheries because NPT fishing effort for slope rockfish would likely have been redeployed into adjacent areas not affected by the fishing impact minimization measures. NPT fishing for slope rockfish currently occurs in those adjacent areas (Table 3.3-1).

C.3.3.2.6 Costs to Consumers

Had it been in place in 2001, Alternative 2 would likely have had some impact on the cost to consumers because, although some or all of the revenue at risk may have been recovered by redeployment of fishing effort, there would likely have been some operational cost increases for the fleet components (Table 3.3-1). These operational cost increases due to Alternative 2 fishing impact minimization measures may have resulted in changes in the product mix, quality, and availability, and, therefore, could under these rules, have resulted in a measurable increase in the cost to consumers of species caught in fisheries directly or indirectly affected by redeployment of the fishing effort. It is not possible, with data and market models currently available, to confirm the existence or size of these potential impacts.

C.3.3.2.7 Management and Enforcement Costs

Management and enforcement costs may have increased under Alternative 2, although it is not possible to estimate by what amount (Table 3.3-1). Under these regulations, additional on-water enforcement could be required to assure compliance with the fishing impact minimization measures applied to the 11 designated areas in the GOA. Although not specifically required by the alternative, a VMS or 100 percent observer coverage could have been needed on all vessels targeting slope rockfish with NPT gear in the GOA to assure compliance with the fishing impact minimization measures under Alternative 2.

Most groundfish vessels operating in the GOA for pollock or Pacific cod fisheries are already equipped with VMS. Vessels not equipped with VMS systems could have been required to install and operate the VMS equipment during the GOA slope rockfish fishery in 2001, and would be in the future, should this alternative be selected by the Council. The GOA slope rockfish fishery occurs primarily 1 to 2 months per year. The number of additional vessels that would have require the VMS system under Alternative 2 is not known. Alternative 2 fishing impact minimization measures are specific to gear (NPT) and target fishery (slope rockfish) and could require additional enforcement measures (boarding and inspection) beyond the typical time/area/fishery management measures currently employed in the GOA.

Although only fishing impact minimization measure Alternative 5B specifically requires the development and implementation of a research and monitoring program, some level of research and monitoring of the effectiveness of the fishing impact minimization measures would likely occur under any alternative adopted. Accomplishing these research and monitoring projects would require significant additional expenditures by the Alaska Region and Alaska Fisheries Science Center over a period of years. Section 3.1.2.7 contains more detail on the NOAA Enforcement and Coast Guard responses to Alternative 2.

C.3.3.3 Distributional Impacts

C.3.3.3.1 Gross Revenue at Risk Effects

C.3.3.3.1.1 Geographic Area Impacts

The impact analysis is presented as if the action in question had, in fact, been adopted and implemented for the 2001 fishing year. Alternative 2 imposes no fishing impact minimization measures in the EBS or AI. Within the GOA, the largest amount of revenue at risk would have been in the Central Gulf of Alaska (CG) with $640,000 at risk, or 8.1 percent of the $7.95 million status quo revenue in the CG (Table 3.3-2). The revenue at risk in the Western Gulf of Alaska (WG) totalsed $230,000, or 28.9 percent of the total status quo revenue of $790,000, reported in 2001. There would have been less revenue at risk in the Eastern Gulf of Alaska (EG), equaling $22,711 or 3.6 percent of the $620,000 status quo revenue, reported in 2001, in the EG.

C.3.3.3.1.2 Fishery Impacts

The only fishery that would have been directly affected by the fishing impact minimization measures, under Alternative 2, is the NPT slope rockfish fishery in the GOA. The total revenue at risk in this fishery would have been $900,000, or 9.6 percent of the 2001 status quo revenue of $9.36 million (Table 3.3-2).

C.3.3.3.1.3 Fleet Component Impacts

The catcher-processor fleet would have had the greatest amount of revenue at risk at $870,000, or 12.3 percent of the status quo total revenue. The catcher-vessel fleet would have had $28,570 of ex-vessel revenue at risk, or 1.2 percent of the 2001 total status quo ex-vessel revenue of $2.33 million. The catcher-vessel fleet would have had revenue at risk only in the CG, whereas the catcher-processor fleet would have had revenue at risk in both the CG and WG. Catcher-processor fleet revenue at risk in the CG would have equal $620,000, or 10.9 percent of 2001 status quo. The catcher-processor fleet would also have had $230,000 of revenue at risk in the WG, or 28.9 percent of the $790,000 status quo 2001 gross revenue in the WG, and nearly all of the $22,711 in revenue at risk in the EG, as well (Table 3.3-2).

C.3.3.3.2 Impacts on Dependent Communities

C.3.3.3.2.1 Overview

Impacts on dependent communities would be expected to be insignificant under Alternative 2, although at least a few individual operations may experience adverse impacts, as detailed below. The only fisheries directly affected by this alternative would be the rockfish fisheries in the GOA, and the only gear group directly affected (for both catcher vessels and catcher-processors) would be non-pelagic trawl. Using 2001 fleet data, 23 vessels (both catcher vessels and catcher-processors) would be affected by this alternative: 3 from Alaska, 4 from Oregon, 15 from Washington, and 1 from another state. Using 2001 processor data, 10 shoreside processors in Alaska would potentially be affected by this alternative.

C.3.3.3.2.2 Catcher Vessels

For catcher vessels, revenue at risk is exclusively concentrated in the CG and represents 1.23 percent of the status quo value (about $29,000 out of $2.33 million) for rockfish fishery harvest of the affected vessels in this area. As noted elsewhere, figures given for catcher vessels represent ex-vessel revenues, which would tend to understate the overall value to associated communities that derive benefits from both harvesting and processing activities if examined alone. Values for first wholesale revenues at risk by shoreside processors from landings of catcher vessels are referenced in the information on shoreside processor locations provided below. As discussed earlier, given the location and size of the closure areas and the small proportion of catch at risk, it is assumed that vessels could recover any potential losses in catch through minimal additional effort. In 2001, the ownership of catcher vessels involved in the at-risk harvest was concentrated in Washington and Oregon communities (with five and four vessels, respectively). Within Alaska, only Kodiak and Anchorage had any vessel ownership, with just one vessel each. No significant impacts are foreseen for these communities as a result of changes associated with catcher vessels under this alternative, due to the low revenues at risk and the small numbers of vessels involved.

C.3.3.3.2.3 Catcher-Processors

For catcher-processors, revenue at risk is concentrated in the CG, but not exclusively so, and represents 12.24 percent of the status quo value (about $860,000 out of $7.04 million) for rockfish fishery harvest of affected vessels in the entire GOA. It is possible that catcher-processors could make up foregone harvests from closed areas by fishing in adjacent open areas, but the costs associated with this increased effort are unknown at this time. The catcher-processors involved in the at-risk harvest generally head, eviscerate, and freeze their catch (and are known as head and gut vessels). Ownership of these vessels is concentrated in Washington with 10 vessels (Kodiak is the only Alaska community with ownership, and then only for 1 vessel; 1 catcher-processor is owned in another state). No significant impacts are foreseen for the community of Kodiak as a result of changes associated with catcher-processors under this alternative, due primarily to having only a single vessel involved. Community level impacts are not anticipated in Washington, even though most vessels with at-risk revenues are concentrated there, due to the large size and diversity of its economy. Individual entities may experience increased costs and/or reductions in harvest.

C.3.3.3.2.4 Shoreside Processors

A summary of the 2001 first wholesale market level impacts of Alternative 2 for shoreside processors (by FMP region of harvest) is presented below. These shoreside processor first wholesale impact estimates are strictly non-additive, with the catcher vessel ex-vessel impact estimates associated with this alternative presented above. Indeed, were the data available to permit a quantitative net impact assessment, the ex-vessel revenues accruing to the catcher vessel operators delivering inshore would appropriately be accounted for as just one of many input costs to the plant's production process (e.g., electricity, water, packaging, labor, etc.). These input costs (e.g., ex-vessel payments to catcher vessels for delivery of raw fish) would be deducted from (rather than summed with) the plant's gross earnings, to arrive at net revenue at this level of the market.

Being unable, due to data limitations, to carry out this final analytical step, the quantitative impact estimates are limited to gross effects. Both market-level impacts (i.e., ex-vessel and first wholesale) are presented to accommodate the specific information needs of each potentially affected sector (e.g., catcher vessels, catcher-processors/motherships, shoreside processors), but their interpretation and application (as noted above) should not be confused. The first wholesale information for shoreside processors may be loosely interpreted for some types of community impacts, but there are four main caveats for the use of this information for these purposes. First, numerous locally important sources of revenue such as fish taxes, which are the cornerstone of municipal revenues in some communities, are more closely tied to the ex-vessel value of landings than to processor first wholesale values. Second, depending on the structure of the individual processors, the individual communities, and the relationships between the two, more or less of the difference between the ex-vessel and first wholesale values may be realized as inputs to the local economy of any particular place. This is due, in part, to the degree to which the individual processing entities are effectively operating as industrial enclaves, the relationship of the workforce to the overall resident labor force (and general population) of the community, the degree of development of local support service industries, local public revenue and service provision structures, and the structure of ownership of the processing entity, among many other factors. Third, the information on first wholesale value for processors is available only on an FMP regional basis and cannot be directly attributed to individual communities, although inferences on general patterns of distribution of impacts may be drawn from the information presented below. Fourth, and perhaps most important, overall harvest levels are unlikely to change substantially as a direct result of this alternative (and a number of other alternatives). While individual entities may be relatively advantaged or disadvantaged, it is likely that these gains and losses will be more or less neutral at the community level, although some cost increases may be anticipated.

For shoreside processors in Alaska, no substantial impacts are foreseen under this alternative because catcher vessel harvest levels are expected to remain constant, and no substantial change in the fishery that would change delivery patterns is forecast (although there may be some relatively minor redistribution of catch among individual vessels). Based on 2001 data, processors involved in the at-risk harvest were concentrated in Kodiak, with eight entities involved. Unalaska/Dutch Harbor and Homer each had one processor that processed at least some volume landed by vessels with some revenue at risk under this alternative. As shown in Table 3.3-3, the total first wholesale value at risk of catch delivered inshore for processing represents approximately 1 percent of the total status quo value (about $149,000 out of $10.78 million) of the relevant fisheries of the CG area, but no breakdown by port of landing is available. Given the very minor potential changes, however, no significant impacts are foreseen for Kodiak or for any other dependent community as a result of changes associated with processors under this alternative.

C.3.3.3.2.5 Multi-Sector Impacts

Multiple sector impacts are unlikely to be significant at the community level under Alternative 2. Among Alaska communities, only Kodiak participates in more that one sector with at-risk revenues and then with only a single locally owned catcher vessel, a single locally owned catcher-processor, and multiple locally operating shoreside processors. As noted, impacts to shoreside processors are anticipated to be insignificant due to the low volumes at risk and the assumption that overall delivery patterns are unlikely to change under this alternative. Some additional Alaska resident crew positions on vessels owned elsewhere may have some compensation at risk, but overall potential for employment and wage or crew share compensation loss is small. Transient vessels owned outside of Alaska typically also make expenditures in ports of landing, which in this case would be concentrated in Kodiak. Given the assumption of general landing patterns remaining consistent, however, any vessel expenditure associated impacts are likely to be minor.

The potential for cumulative impacts is less straightforward. Even if the potential for social impacts under Alternative 2 would not be significant in isolation, this alternative would have the potential, nonetheless, to impose adverse cumulative impacts when evaluated in the context of other factors that currently affect North Pacific and EBS fisheries and fishing communities. Cumulative effects could include interactions with the social impacts of, among others, the near-shore closures put in place in 2001 to protect Steller sea lions, proposed rationalization of the BSAI crab and GOA groundfish fisheries, and the severe decline of salmon prices. These effects would likely be concentrated in communities with (relatively) significant dependence on small boat fleets and those that depend on both salmon harvesting and one or more of the fisheries that would be affected by the alternative.

C.3.4 Alternative 3

This alternative would amend the GOA Groundfish FMP to prohibit the use of bottom trawls targeting rockfish along the GOA slope (200 to 1,000 m), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed gear or pelagic trawl gear. For a more detailed description of the fishing impact minimization measures imposed by Alternative 3, see EIS Section 2.3.3. For a description of the environmental consequences of Alternative 3, see EIS Section 4.3.

C.3.4.1 Benefits Associated with Alternative 3

C.3.4.1.1 Passive-use Benefits

Under the simplifying analytical convention that Alternative 3 was in effect in 2001, NPT fishing activities targeting rockfish along the slope (200 to 1,000 m) of the GOA would have been eliminated. While it is not possible at this time to provide an empirical estimate of the passive-use value attributable to this protection of EFH, it is assumed that Alternative 3 would yield some incremental increase in the passive-use benefit of EFH over the status quo Alternative 1 (Table 3.4-1). Alternative 3 would minimize the impact of NPT fishing for slope rockfish over a total of 29,059 sq. km of GOA shelf and slope edge habitat, or 10.4 percent of the existing fishable area of 279,874 sq. km (Table 1.4-1). See EIS Section 4.3 for details on the environmental consequences of Alternative3.

C.3.4.1.2 Use and Productivity Benefits

Alternative 3 is designed to reduce the effects on EFH of NPT fishing for slope rockfish along the slope edge in the GOA beyond measures currently in place or planned as part of other fishery management actions. Current scientific knowledge does not permit either a quantitative or qualitative assessment of the use benefits derived from minimizing the effects of fishing on EFH. However, the assumption implicit in the amendment to the Magnuson-Stevens Act requirement to minimize effects of fishing on EFH is that doing so would result in the sustained or enhanced production from FMP species and contribute to a healthy ecosystem (Table 3.4-1). As such, Alternative 3 would contribute additional measures to further reduce the impacts of fishing on EFH.

C.3.4.2 Costs Associated with Alternative 3

C.3.4.2.1 Industry Revenue at Risk

Had it been implemented in 2001, Alternative 3 would have placed a total of $2.65 million of gross revenue at risk in the GOA NPT slope rockfish target fisheries, including the value of retained bycatch. This was equal to 28.3 percent of the reported 2001 status quo total revenue of $9.36 million (Table 3.4-1).

The fishing impact minimization measure areas described under Alternative 3 would have been imposed upon the GOA shelf and slope edge between 200 and 1,000 m. Although some slope rockfish are caught at depths shallower than 200 m in the GOA with NPT, a majority of the NPT commercial catch of the slope rockfish complex occurs at depths in excess of 150 m (NMFS 2002d). There is limited fishing area for slope rockfish in the 150 to 200 m slope edge adjacent to the 200 to 1,000 m area designated for fishing impact minimization measures. This suggests that there would have been limited areas where the revenue at risk might have been mitigated, in whole or in part, by a redeployment of NPT fishing effort. Approximately 20 percent of the catch of the primary slope rockfish species, Pacific ocean perch, is taken by PTR, fished by larger catcher-vessel and catcher-processor fleet components. Between 30 and 50 percent of the shortraker/rougheye rockfish in the slope rockfish complex are taken incidentally, by HAL gear, in the sablefish and halibut fisheries.

Under Alternative 3, not all revenue at risk could have been recovered by redeployment of fishing effort to adjacent areas or switching to PTR gear by most of the fleet components involved in the fishery in 2001. The smaller catcher-vessel fleet targeting slope rockfish almost exclusively uses NPT gear and has neither sufficient horsepower to fish PTR, nor the revenue from participation in this fishery to warrant the investment needed to use PTR gear. The larger catcher vessels (which also target pollock) and the catcher-processors either already have PTR gear available or have sufficient horsepower to convert to PTR to target slope rockfish. Under Alternative 3, while the revenue at risk might have been recovered by vessels fishing adjacent areas, not affected by the alternative, or by switching to PTR gear within the protected area, there would likely have been a transference of catch share, and thus a transfer of revenue in the fishery from the smaller catcher-vessel fleet component to the larger catcher-vessel and catcher-processor fleet components. The magnitude of this transfer is impossible to estimate without specific knowledge of the redeployment fishing effort strategies that would have been followed by the different fleet components, faced with these fishing rules in 2001. Nor is it possible to estimate the total amount of the revenue at risk under Alternative 3 that could have been recovered by redeployment of fishing effort to adjacent areas or to alternative fishing gears. Such an estimate is not possible without a thorough understanding of the fishing strategies that would have actually been employed by fishermen in response to the impacts of the fishing impact minimization measures imposed by Alternative 3. That information is not available.

C.3.4.2.2 Product Quality and Revenue Impacts

Revenue impacts from changes in product quality would have been possible under Alternative 3, particularly for the smaller catcher-vessel fleet component that could have been required to expend additional fishing effort to recover the catch at risk. This could have lengthened fishing trips and result in diminished product quality. Product quality might not have been affected in the catcher-processor fleet component, since these vessels process the catch onboard the vessel.

C.3.4.2.3 Operating Cost Impacts

Operating costs under Alternative 3 c would likely have been greater overall for both catcher-vessel and catcher-processor fleet components. CPUE of slope rockfish caught with PTR gear and with NPT gear at depths shallower than 200 m along the GOA slope edge is very likely to have been lower than the CPUE of NPT gear in the depth range of 200 m and greater normally fished for these species. If this were not the case, one would expect to observe this behavior in the absence of regulations that make it necessary. This may have resulted in increased fishing effort and associated increased operational costs to make up the catch and revenue at risk.

C.3.4.2.4 Safety Impact

Alternative 3 could have adversely affected safety in all fleet components of the GOA slope rockfish fishery, given the likelihood of significant changes in the operational aspects of these fleets and possible increased fishing effort to mitigate the revenue at risk.

C.3.4.2.5 Impacts on Related Fisheries

There may very well have been an impact on related fisheries from Alternative 3, had it been in place in 2001, because a substantial amount of NPT fishing effort for slope rockfish would likely have been redeployed into adjacent areas shallower than 200 m and not directly affected by Alternative 3. Other fisheries already use these areas, including halibut longline, Pacific cod longline (if open), and other NPT fisheries such as shallow water flatfish. Increased NPT fishing effort at depths less than 200 m along the GOA shelf edge may have imposed substantial economic and operational externalities on these fisheries.

C.3.4.2.6 Costs to Consumers

Alternative 3 would have been likely to have imposed some impact on costs to consumers because, although some or all of the revenue at risk may have been recovered by redeployment of fishing effort, there would likely have been some operational cost increases for the affected fleet components (Table 3.4-1). These operational cost increases, due to Alternative 3 fishing impact minimization measures, may have resulted in a measurable increase in price to consumers of species caught in fisheries directly or indirectly affected by redeployment of the fishing effort, had these measures been in place for the 2001 fisheries. There may also have been welfare costs imposed on consumers from changes in availability of supply, product mix, and/or quality.

C.3.4.2.7 Management and Enforcement Costs

Management and enforcement costs would have been likely to increase under Alternative 3, although it is not possible to estimate by what dollar amount. Section 3.1.2.7 contains some additional detail on the NOAA Enforcement and Coast Guard responses to resource demands connected with monitoring and enforcing provisions of Alternative 3. Although not specifically required by the alternative, a VMS or 100 percent observer coverage could have been needed on all vessels targeting slope rockfish with NPT gear in the GOA to assure compliance with the fishing impact minimization measures under Alternative 3. Most groundfish vessels operating in the GOA for pollock or Pacific cod are already equipped with a VMS. Vessels not equipped with VMS systems might have needed to install and operate the VMS equipment during the 2001 GOA slope rockfish fishery, which traditionally occurs primarily during 1 to 2 months of the year. The number of additional vessels that might have needed to add VMS equipment under Alternative 3 is not known. Alternative 3 fishing impact minimization measures are specific to gear (NPT) and target fishery (slope rockfish) and could, when adopted, require additional enforcement measures (boarding and inspection) beyond the typical time/area/fishery management measures currently employed in the GOA.

Although only fishing impact minimization Alternative 5B specifically requires the development and implementation of a research and monitoring program, some level of research and monitoring of the effectiveness of the fishing impact minimization measures would likely occur under any alternative adopted. Accomplishing these research and monitoring projects would require significant additional expenditures by the Alaska Region and Alaska Fisheries Science Center over a period of years.

C.3.4.3 Distributional Impacts

C.3.4.3.1 Gross Revenue at Risk Effects

C.3.4.3.1.1 Geographic Area Impacts

Assuming, for sake of analysis, that the 2001 fisheries were regulated under Alternative 3, it would have imposeds no fishing impact minimization measures in the EBS or AI. Within the GOA, the largest amount of revenue at risk would have been in the CG, with $2.2 million at risk, or 28.0 percent of the $7.95 million 2001 status quo revenue (Table 3.4-2). The revenue at risk in the WG would have totalsed $220,000, or 27.3 percent of the 2001 total status quo revenue of $790,000. The revenue at risk in the EG would have totaleds $210,000, or 33.3 percent of status quo revenue (EG).

C.3.4.3.1.2 Fishery Impacts

The only fishery that would have been directly affected by Alternative 3 is the NPT slope rockfish fishery in the GOA. The total revenue at risk in this fishery was $2.65 million, or 28.3 percent of the status quo revenue of $9.36 million in 2001 (Table 3.4-2).

C.3.4.3.1.3 Fleet Component Impacts

The catcher-processor fleet would have had the greatest amount of revenue at risk, equaling $2.2 million or 31.5 percent of the status quo total revenue of $7.04 million. The catcher-vessel fleet would have had $430,000 of ex-vessel revenue at risk, or 18.6 percent of the total ex-vessel revenue of $2.33 million, recorded in 2001. The catcher-vessel fleet would have had revenue at risk primarily in the CG, whereas the catcher-processor fleet would have revenue at risk in both the CG and WG. Catcher-processor fleet revenue at risk in the CG would have equaled $1.80 million, or 31.9 percent of the 2001status quo in the CG. In the WG, catcher-processor revenue at risk would have equaled $220,000, or 27.3 percent of status quo (Table 3.4-2). In the EG, nearly all of the $210,000 revenue at risk in that region would have been accounted for by catcher-processors.

C.3.4.3.2 Impacts on Dependent Communities

C.3.4.3.2.1 Overview

Impacts on dependent communities would be expected to be insignificant at the community level under Alternative 3, although a number of individual operations may experience adverse impacts. The only fisheries directly affected by this alternative would be GOA slope rockfish species within the overall rockfish category, and the only gear group directly affected (for both catcher vessels and catcher-processors) would be non-pelagic trawl. Using 2001 fleet data, 39 vessels (catcher vessels and catcher-processors) would be affected by this alternative: 12 in Alaska, 8 from Oregon, 18 from Washington, and 1 from another state. Using 2001 processor data, 16 shoreside processors in Alaska potentially would be affected by this alternative.

C.3.4.3.2.2 Catcher Vessels

For catcher vessels, revenue at risk is exclusively concentrated in the CG and represents 18.6 percent of the status quo value (about $430,000 out of $2.33 million) for rockfish fishery harvest of the affected vessels in this area. As discussed earlier, given the location and size of the closure areas and the proportion of catch at risk, it is assumed that as an overall sector, it is possible that vessels could recover any potential losses in catch through additional effort (although the associated costs are unknown) or gear switching (to pelagic trawl gear). As noted earlier, however, the smaller vessels in the fleet targeting rockfish almost exclusively use non-pelagic trawl gear and do not have the same flexibility to switch gear as the larger vessels in the fleet. Therefore, even if there were no large net change in catcher-vessel harvest amounts, the smaller vessel fleet may experience marked adverse impacts (through an effective flow of catch to larger vessels).

Based on 2001 data, Pacific Northwest vessels outnumber Alaska vessels with at-risk revenues, with ownership almost evenly split between Washington (seven vessels) and Oregon (eight vessels). Within Alaska, ownership of relevant vessels is concentrated in Kodiak (nine vessels), with only Anchorage having additional Alaska ownership (one vessel). While all catcher vessels involved in the at-risk harvest are classified as large (over 60 feet), ownership of the vessels at the lower end of the large range is concentrated in Kodiak, so it is likely there would be some net flow away from the community if smaller vessels lose share to larger vessels. For the relevant Kodiak fleet in 2001, the at-risk revenues in the rockfish fishery represent somewhat more than 2 percent of total ex-vessel payments to these vessels for all fisheries in all areas combined. As noted elsewhere, figures given for catcher vessels represent ex-vessel revenues, which would tend to understate the overall value to associated communities that derive benefits from both harvesting and processing activities if examined alone. Values for first wholesale revenues at risk by shoreside processors from landings of catcher vessels are referenced in the discussion of shoreside processor locations provided below. Individual entities within Kodiak may experience adverse impacts under this alternative, particularly smaller vessels, as there may be expected shifts in harvests away from smaller vessels to both larger catcher vessels and catcher-processors, but the magnitude of this potential shift is unknown. Further, as noted elsewhere, the methodology employed to assign distribution of catch within statistical reporting areas may tend to underestimate the actual concentration of catch within the specific closure areas within statistical blocks, particularly for slope rockfish closures and, therefore, to underestimate revenue at risk in a similar manner. It is considered unlikely, however, that the overall loss of revenue and/or the shift from small vessels would result in impacts that would be significant at the community level in Kodiak, due to the relatively small proportion of rockfish value compared to the overall value of the harvest for the involved vessels as a fleet (although some individual vessels may experience increased cost and/or decreased catch). No significant impacts are foreseen for any dependent community outside of Kodiak as a result of changes associated with catcher vessels under this alternative. No significant community level impacts are anticipated for Pacific Northwest communities, due to the size and diversity of the local economic base (although there may be some loss of revenue or catch for a number of involved vessels).

C.3.4.3.2.3 Catcher-Processors

For catcher-processors, revenue at risk is concentrated in the CG, but not exclusively so, and represents 31.53 percent of the status quo value (about $2.22 million out of $7.04 million) for rockfish fishery revenues for the affected vessels in the entire GOA. The revenue at risk represents between 1 and 2 percent of the combined total revenue of the harvest that these vessels take from all the fisheries in which they participate, so the overall impact on the affected fleet would be minimal (although impacts to any particular operation may be greater, depending on specific operational characteristics). Similar to the larger catcher vessels, it is assumed that catcher-processors may be able, with additional effort, to make up foregone harvests from closed areas by changing location or gear strategies, but the costs associated with the extra effort are not known. In this particular case, at-risk harvest could be recovered in part or in whole specifically by effort directed toward shallower areas, or a switch to pelagic trawl gear. The catcher-processors involved in the at-risk harvest are head and gut vessels, and ownership of these vessels is concentrated in the Pacific Northwest, with Washington ownership accounting for 11 out of the 15 vessels with at-risk revenue according to the 2001 data. Kodiak is the only Alaska community with relevant vessel ownership with three catcher-processors with at-risk revenues (and one vessel is owned in another state). The small number of entities precludes disclosure of value data for the Kodiak vessels, but it is assumed that, while there may be hardships for some of the entities involved, no significant impacts are likely for the community of Kodiak as a result of changes associated with catcher-processors under this alternative. For Washington communities, it is unlikely that significant community-level impacts would result from this alternative, given the size and diversity of the local economy, although individual firms may experience adverse impacts under this alternative. Further, while patterns of distribution between Kodiak and Washington vessels cannot be disclosed, the likelihood of significant impacts on either Kodiak or Washington communities is reduced by the small proportion the at-risk revenues comprise of overall catcher-processor harvest revenues for all fisheries in which they participate.

C.3.4.3.2.4 Shoreside Processors

For shore-based processors, in general, no substantial impacts are foreseen under this alternative because catcher-vessel harvest levels are expected to remain at or near status quo levels, and no substantial change in the fishery that would affect delivery patterns is forecast (although there may be some redistribution of catch among individual vessels). There may be some increased costs due to increased catcher vessel effort, but the amount of this increase is unknown. Based on 2001 data, processors involved in the at-risk harvest are concentrated in Kodiak, with nine entities operating. A number of other communities had one or two processors that processed at least some groundfish from vessels with at-risk revenues under this alternative: Akutan and Unalaska/Dutch Harbor (two each), along with King Cove, Seward, and Cordova (one each). As shown in Table 3.3-3, the total first wholesale value at risk of catch delivered inshore for processing represents approximately 16 percent of the total status quo value (about $1.73 million out of $10.79 million) of the relevant fisheries of the CG area, but no breakdown by port of landing is available. Caution must be exercised in the interpretation of these wholesale value data as (1) they are not additive with ex-vessel values presented above, and (2) they cannot be used as a proxy for potential levels of impacts to specific communities without considering the basic caveats laid out in the introductory paragraphs of Section C.3.3.3.2.4 of the Alternative 2 discussion. Given the comparatively modest overall value of the target slope rockfish fishery to shoreside processors and the low level of revenue at risk compared to overall processing in these communities, however, no significant impacts are foreseen for Kodiak or any other dependent community as a result of changes associated with processors under this alternative, although some individual processing entities may experience greater impacts than others.

C.3.4.3.2.5 Multi-Sector Impacts

Multiple sector impacts are unlikely to be significant at the community level under Alternative 3. Among Alaska communities, only Kodiak participates in more that one sector with at-risk revenues, with nine locally owned catcher vessels, three locally owned catcher-processors, and multiple locally operating shoreside processing plants having at least some revenue at risk under this alternative. Revenue at risk for relevant catcher vessels and catcher-processors is roughly 2 percent of total revenues for these vessels, but individual vessels may experience lesser or greater losses. As noted, impacts to shoreside processors are anticipated to be insignificant, due to the low volumes at risk and the assumption that overall delivery patterns are unlikely to change under this alternative. Some additional Alaska (and specifically Kodiak) resident crew positions on vessels owned elsewhere but that spend at least part of the year in Alaska ports may have some compensation at risk, but overall potential for employment and wage or crew share compensation loss is small. Transient vessels owned outside of Alaska typically also make expenditures in ports of landing, which in this case would be concentrated in Kodiak. Given the assumption of general landing patterns remaining consistent, however, any vessel expenditure associated impacts are likely to be minor. Overall, while community impacts in Alaska would be concentrated in Kodiak, it is unlikely that these impacts would rise to the level of significance at the community level, given the relatively few vessels affected by the alternative compared to the overall community fleet, and the relatively low magnitude of the revenue at risk when compared to the overall revenues of the involved vessels, much less those of the local fleet overall.

The potential for cumulative impacts is less straightforward. Even if the potential for social impacts under Alternative 3 would not be significant in isolation, this alternative would have the potential, nonetheless, to impose adverse cumulative impacts when evaluated in the context of other factors that are currently affecting North Pacific and EBS fisheries and fishing communities. Cumulative effects could include interactions with the social impacts of, among others, the near-shore closures put in place in 2001 to protect Steller sea lions, proposed rationalization of the BSAI crab and GOA groundfish fisheries, and the severe decline of salmon prices. These effects would likely be concentrated in communities with (relatively) significant dependence on small boat fleets and communities that depend on both salmon harvesting and one or more of the fisheries that would be affected by the alternative.

C.3.5 Alternative 4

Alternative 4 would amend the GOA Groundfish FMP to prohibit the use of bottom trawls targeting rockfish in 11 designated areas of the GOA slope (200 to 1,000 m), but would allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed gear or pelagic trawl gear. Alternative 4 would also amend the BSAI Groundfish FMP to establish designated rotating closure areas to the use of NPT gear in the EBS and establish permanent NPT gear closure areas in designated areas of the AI. For a more detailed description of the fishing impact minimization measures imposed by Alternative 4, see EIS Section 2.3.3.

C.3.5.1 Benefits Associated with Alternative 4

C.3.5.1.1 Passive-use Benefits

Had Alternative 4 been in place in 2001, NPT fishing activities targeting slope rockfish in 11 designated areas of the GOA would have been eliminated; use of NPT gear would have been closed in 25 percent of five areas in the EBS on a ten-year rotational basis, with bobbins required on NPT gear fished in other areas; and the use of NPT gear would have been prohibited in designated areas of the AI. While it is not possible at this time to provide an empirical estimate of the passive-use value attributable to this level of protection of EFH, it is assumed that, had it been in place in 2001, Alternative 4 would have yielded some incremental increase in the passive-use benefit of EFH over the status quo Alternative 1 (Table 3.5-1). Each year, Alternative 4 would reduce the impact of NPT fishing for slope rockfish over a total of 10,228 sq. km of GOA shelf and slope edge habitat, NPT fishing for all species over an average of 47,986 sq. km of EBS habitat, and 22,883 sq. km of AI habitat, for a total of 81,097 sq. km. This would affect 3.6 percent of the current 279,874 sq. km. of GOA shelf and slope edge habitat, 6.0 percent of the current 798,870 sq. km. of EBS habitat, and 19.7 percent of the current 105,243 sq. km. of AI habitat, for a total of 6.8 percent of the total fishable area in the GOA, EBS, and AI combined (Table 1.4-1). Alternative 4 would have been expected to further reduce NPT fishing impacts in the EBS by requiring disks and bobbins on trawl sweeps and footropes used in open areas (see EIS Sections 2.3.3 and 4.3 for details on the fishing impact minimization measures and the environmental consequences of Alternative 4).

C.3.5.1.2 Use and Productivity Benefits

Alternative 4 is designed to reduce the effects on EFH of NPT fishing in the GOA, EBS, and AI beyond measures currently in place or planned as part of other fishery management actions. Current scientific knowledge does not permit either a quantitative or qualitative assessment of the use benefits derived from minimizing the effects of fishing on EFH. However, the assumption implicit in the amendment to the Magnuson-Stevens Act requirement to minimize effects of fishing on EFH is that doing so would result in the sustained or enhanced production of FMP species and contribute to a healthy ecosystem (Table 3.4-1). As such, Alternative 4 would contribute additional protection measures that could further reduce the impacts of fishing on EFH.

C.3.5.2 Costs Associated with Alternative 4

C.3.5.2.1 Industry Revenue at Risk

Depending upon the EBS rotational areas closed, had Alternative 4 been in place in 2001, this action would have placed a total of \$3.53 million to \$6.11 million of gross revenue at risk in NPT fisheries in the GOA, EBS, and AI, or 2.2 to 3.8 percent of the status quo total revenue of \$156.86 million to \$162.79 million (Table 3.5-1).

The 11 designated fishing impact minimization measure areas described under Alternative 4 are discreet and widely spaced along the GOA outer shelf and slope edge. There is substantial slope rockfish fishing area adjacent to the 11 areas designated for fishing impact minimization measures where some or possibly all of the revenue at risk might be mitigated by a redeployment of fishing effort. Additionally, slope rockfish are caught with pelagic trawl gear (PTR) used primarily by the larger catcher-vessel and catcher-processor fleet components (NMFS 2002d). Continuing with the analytical convention adopted above, the revenue at risk in the catcher-vessel fleet would have been very small, compared with the status quo revenue, had Alternative 4 been the rule in 2001. Therefore, the revenue at risk might have been mitigated, in part or in whole, by redeploying NPT fishing effort into adjacent areas not directly affected by Alternative 4. Although the revenue at risk in the catcher-processor fleet under Alternative 4 would have been larger than that in the catcher-vessel fleet, representing more than 12 percent of the total 2001 status quo revenue in the catcher-processor fleet component of this fishery, catcher-processor revenue at risk might also have been partially or completely mitigated by redeploying NPT fishing effort for slope rockfish to fishing areas adjacent to the protected areas.

Alternative 4 would impose a closure to NPT fishing in 25 percent of five areas, with each 25 percent area closure rotating on a 10-year basis. Had these fishing impact minimization measures been in place in 2001, they would have placed approximately 2.9 to 4.8 percent of that year's status quo revenue at risk, depending upon the rotation areas affected. The EBS revenue at risk would have accrued mainly to the catcher-processor fleet component. The revenue at risk in the EBS may have been capable of being mitigated by fishing with NPT gear in adjacent areas, not directly affected by the closures, although crowding externalities, reduced CPUE, bycatch triggered closures, etc., make this uncertain. There may have been additional revenue placed at risk in the EBS under Alternative 4 by the requirement to use bobbins and disks on trawl sweeps for all NPT gear used in open areas; however, the additional adverse economic impact is unknown.

In the 2001 AI fisheries, Alternative 4 would have closed designated areas to fishing for all species, with NPT gear, and would have resulted in placing 1.5 percent of the 2001 status quo revenue in these fisheries at risk. The AI revenue at risk under Alternative 4 would have accrued mainly to the catcher-processor fleet component and might have been mitigated by redeploying NPT fishing effort to adjacent areas, not directly affected by the closures, with the same caveats noted above for EBS NPT.

It is not possible to estimate the amount of the revenue at risk, under Alternative 4, that could have been recovered by redeployment of fishing effort to adjacent areas or to alternative fishing gears without a thorough understanding of the fishing strategies that would actually be employed by fishermen in response to the impacts of the fishing impact minimization measures imposed by Alternative 4.

C.3.5.2.2 Product Quality and Revenue Impacts

Revenue impacts from changes in product quality are possible under Alternative 4, particularly for the smaller catcher-vessel fleet component that may be required to expend additional fishing effort to recover displaced catch, which may lengthen fishing trips and result in diminished product quality (Table 3.5-1). Product quality may not be affected in the catcher-processor fleet component, since these vessels process the catch onboard the vessel, although product mix could be adversely affected (e.g., if the average size of fish declines).

C.3.5.2.3 Operating Cost Impacts

Operating cost impacts under Alternative 4 in the GOA may be minimal for the catcher-vessel fleet, given the small amount of revenue at risk for this fleet component. Operational costs for the catcher-processor fleet component may increase due to the redeployment of fishing effort necessary to mitigate the losses imposed by Alternative 4; in 2001, these would have been 12.3 percent of the status quo revenue estimated to be at risk for this fleet component. Fishing effort redeployed into areas adjacent to the protected areas may have lower CPUE of slope rockfish, requiring additional fishing effort to make up the catch and revenue at risk (Table 3.5-1).

Catcher-processors operating in the EBS NPT flathead sole fishery may have had some increased operational costs, had Alternative 4 been in place in 2001, due to increased running time to reach northern fishing areas when the more southerly areas are closed. They could have also experienced increased operational costs associated with increased fishing effort to mitigate the revenue at risk in these fisheries (Table 3.5-1). It is impossible to estimate the increase in operational costs without fully understanding the fishing effort redeployment strategy that the operators would follow to mitigate revenue placed at risk under Alternative 4; in 2001 these rules would have placed 8.5 to 23.1 percent of the status quo revenues at risk.

Alternative 4 would require the use of bobbins and disks on NPT footropes and trawl sweeps used in open areas. The use of bobbins and disks may reduce the CPUE of some bottom-dwelling species, such as flatfish, resulting in increased fishing time and associated increased operational costs to attain the status quo catch and revenue in these fisheries. This operational impact would occur primarily in the catcher-processor fleet component in the EBS.

In the AI, Alternative 4 would have placed a relatively small amount of the 2001 status quo revenue at risk and may not have resulted in significant increases in operating costs of either the catcher-vessel or catcher-processor fleet components.

C.3.5.2.4 Safety Impact

If implemented for the 2001, Alternative 4 may not have significantly affect the safety of any of the fleet components in the GOA, because fishing effort would likely have been redeployed to adjacent fishing areas with similar CPUE and attributes (e.g., distance from port, distance from safe harbor or shelter, etc.) (Table 3.5-1).

In the EBS, catcher-processors targeting flathead sole, other flatfish, and Pacific cod would have been restricted from fishing some areas closer to their home ports during some time periods, depending upon the area affected by the rotational closures to NPT gear. When more southerly areas are closed, vessels fishing NPT gear would have to travel farther north and farther from ports of call, possibly having an adverse effect on safety.

Alternative 4 may not have significantly affected the safety of any of the fleet components in the AI, because fishing effort would likely have been redeployed to adjacent fishing areas.

C.3.5.2.5 Impacts on Related Fisheries

There may not have been significant impacts on related fisheries from Alternative 4, in 2001, in the GOA, because NPT fishing effort for slope rockfish would likely have been redeployed into adjacent areas where NPT fishing for slope rockfish traditionally occurs (Table 3.5-1).

There may have been impacts on related fisheries in the EBS and AI, if vessels using NPT gear had been displaced into adjacent areas where other gear groups such as HAL and POT vessels were operating.

C.3.5.2.6 Costs to Consumers

Some impact on the cost to consumers from Alternative 4 would have been is likely to occur because, although some of the revenue at risk may have been recovered, in 2001, by redeployment of fishing effort, there would likely have been some operational cost increases for the fleet components (Table 3.5-1). These operational cost increases due to Alternative 4 fishing impact minimization measures may have resulted in a measurable increase in the price to consumers of species caught in fisheries directly or indirectly affected by redeployment of fishing effort, depending on specific market conditions (e.g., demand elasticities and availability of substitute supplies). There may also have been costs imposed on consumers from changes in availability of supply, product mix, and/or product quality.

C.3.5.2.7 Management and Enforcement Costs

Management and enforcement costs may increase under Alternative 4, although it is not possible to estimate by what amount. Additional on-water enforcement may be required to assure compliance with the fishing impact minimization measures applied in the GOA, EBS, and AI (Table 3.5-1). Section 3.1.2.7 contains some additional detail on the NOAA Enforcement and Coast Guard responses to resource demands connected with monitoring and enforcing provisions of Alternative 4.

Although not specifically required by the alternative, a VMS or 100 percent observer coverage might be needed on all vessels targeting slope rockfish with NPT gear in the GOA and all vessels using NPT gear in the EBS and AI to assure compliance with the fishing impact minimization measures under Alternative 4. Most groundfish vessels operating in the GOA, EBS, and AI for pollock or Pacific cod fishery are already equipped with a VMS. Vessels not equipped with VMS systems might need to install and operate the VMS equipment during NPT fisheries in the GOA, EBS and AI. The number of additional vessels that might need to add VMS equipment under Alternative 4 is not known. Alternative 4 fishing impact minimization measures are specific to gear (NPT) and may require additional enforcement measures (boarding and inspection) beyond the typical time/area/fishery management measures currently employed in the GOA.

Although only fishing impact minimization measure Alternative 5B specifically requires the development and implementation of a research and monitoring program, some level of research and monitoring of the effectiveness of the alternative would likely occur under any alternative adopted. Accomplishing these research and monitoring projects would require significant additional expenditures by the Alaska Region and Alaska Fisheries Science Center over time.

C.3.5.3 Distributional Impacts

C.3.5.3.1 Gross Revenue at Risk Effects

C.3.5.3.1.1 Geographic Area Impacts

If implemented, Alternative 4 would impose s fishing impact minimization measures in the GOA, EBS, and AI. Within the GOA, had this alternative been in place in 2001, the largest amount of revenue at risk would have been in the CG, with $640,000 at risk, or 8.1 percent of the $7.95 million status quo revenue in the CG (Table 3.5-2). The revenue at risk in the WG would have totaled $230,000, or 28.9 percent of the 2001 total status quo revenue of $790,000. There would have been very little revenue at risk in the EG, equaling $22,711 or 3.6 percent of the $620,000 total status quo revenue for that area in 2001.

In the EBS, Alternative 4 would have placed between $1.82 million and $4.40 million in revenue at risk, or 2.0 to 4.5 percent of the $90.92 million to $96.74 million in 2001 status quo revenue in the affected fisheries.

In the AI, had this alternative been in place, $820,000 of revenue would be placed at risk, or 1.4 percent of the $56.70 million status quo revenue in the affected fisheries, in 2001.

C.3.5.3.1.2 Fishery Impacts

In the GOA, the only fishery that would have been directly affected by Alternative 4, had it been in place in 2001, is the NPT slope rockfish fishery. The total revenue at risk in this fishery would have been $900,000, or 9.6 percent of the status quo revenue of $9.36 million in 2001 (Table 3.5-2).

Alternative 4 would place revenues at risk in a number of NPT target fisheries in the EBS, including flathead sole, yellowfin sole, rock sole, other flatfish, Pacific cod, among others. However, the largest revenue at risk would occur in the flathead sole fishery, where, had Alternative 4 been the rule in 2001, $1.23 million to $3.34 million of revenue would have been placed at risk, equaling 8.5 to 23.1 percent of the $14.46 million status quo revenue, depending upon the rotational area affected.

In the AI, under the same assumption, Alternative 4 would have placed revenue at risk in NPT fisheries for Atka mackerel, flatfish, Pacific cod, and rockfish. The largest revenue at risk in the AI would have been in the NPT rockfish fishery, where $460,000 or 8.6 percent of the total status quo revenue value of $5.4 million would have been placed at risk. The impact on the Atka mackerel fishery would have placed$80,000 at risk, or 0.2 percent of the $41.16 million 2001 status quo value in this fishery.

C.3.5.3.1.3 Fleet Component Impacts

In the GOA, the catcher-processor fleet would have had the greatest amount of revenue at risk, in 2001 equaling $870,000, or 12.3 percent of the status quo total revenue. The catcher-vessel fleet would have had $28,570 of ex-vessel revenue at risk, or 1.2 percent of the total ex-vessel revenue of $2.33 million. The catcher-vessel fleet would have had revenue at risk only in the CG. The catcher-processor fleet would have had 2001 revenue at risk mainly in the CG ($620,000, or 10.9 percent of status quo), but also in the WG ($230,000, or 28.9 percent of the $790,000 status quo gross revenue), and nearly all of the $22,711 revenue at risk in the EG, had Alternative 4 been in place that year (Table 3.5-2).

In the EBS, substantially all of the revenue at risk would occurs in the catcher-processor fleet component. Assuming this rule had been in place in 2001, a total of $1.82 million to $4.40 million of revenue would have been placed at risk, equaling 2.0 to 4.8 percent of the $90.34 million to $90.92 million of status quo revenue, depending upon the rotational areas affected.

In the AI, the catcher-processor NPT fleet would have accounted for substantially all of the $820,000 revenue at risk, or 1.4 percent of the 2001 total status quo revenue of $56.7 million.

C.3.5.3.2 Impacts on Dependent Communities

C.3.5.3.2.1 Overview

Impacts on dependent communities would not be significant at the community level under Alternative 4, although a number of individual operations may experience adverse impacts. The only fisheries directly affected by this alternative would be groundfish fisheries. Unlike Alternatives 2 and 3, however, groundfish fisheries would be affected by this alternative in addition to the targeted rockfish fishery. Further, this alternative would have impacts on GOA, EBS, and AI fisheries, but the only gear group directly affected for both catcher vessels and catcher-processors would be non-pelagic trawl. Using 2001 fleet data, 43 vessels (both catcher vessels and catcher-processors) would be affected by this alternative: 4 in Alaska, 3 from Oregon, 31 from Washington, and 5 from other states. Using 2001 processor data, between 11 and 19 shoreside processors in Alaska would potentially be affected by this alternative, depending on specific closure configurations.

For the GOA, impacts to catcher vessels, catcher-processors, and processors would be identical to those seen under Alternative 2. As a result, as in Alternative 2, no significant impacts to dependent communities in the GOA are anticipated under this alternative. Potential impacts to EBS fishery associated communities are described in the following subsections.

C.3.5.3.2.2 Catcher Vessels

Based on 2001 data, Alaska-owned catcher vessels that would be affected by this alternative are associated with Kodiak (two vessels) and Anchorage (one vessel). Overall ownership is dominated by the Pacific Northwest, with 13 to 16 vessels from Washington and 3 to 4 vessels from Oregon (and one vessel from another state). For catcher vessels in the EBS, the only potentially affected fisheries are Pacific cod and pollock. The revenue at risk under any of the rotational area closure scenarios represents a negligible portion (less than 0.03 percent) of the total status quo revenues (less than $2,000 out of $5.85 million) for these species for relevant catcher vessels in this area ($5.85 million). For catcher vessels in the AI, the only potentially affected fishery is for Pacific cod, and the potential revenue at risk represents a negligible portion (0.12 percent or less) of the total status quo revenues for this species for relevant catcher vessels in this area (less than $2,000 out of $1.21 million to $1.32 million). As noted elsewhere, figures given for catcher vessels represent ex-vessel revenues, which would tend to understate the overall value to associated communities that derive benefits from both harvesting and processing activities if examined alone. Values for first wholesale revenues at risk by shoreside processors from landings of catcher vessels are referenced in the discussion of shoreside processor locations provided below. As a result of the negligible at-risk portion of the total groundfish fishery in either the EBS or AI, no significant impacts to dependent communities related to catcher vessels are anticipated for any area.

C.3.5.3.2.3 Catcher-Processors

Based on 2001 data, 24 catcher-processors would have revenue at risk under Alternative 4. Ownership of these vessels is concentrated in Washington (18 vessels), while Alaska-based ownership is exclusively in Kodiak (2 vessels). Vessels from other states account for the remaining four entities. For catcher-processors in the EBS, there is a wide range of potentially affected groundfish species. The catcher-processors involved in the at-risk harvest are generally head and gut vessels. The revenue at risk under any of the rotational area closure scenarios represents a small portion (2.11 to 4.94 percent) of the total status quo revenues for the relevant species for the affected catcher-processors in this area ($2.10 million to $4.94 million out of $99.42 million to $100 million), and it is assumed that at least some portion of this already minimal at-risk revenue could be made up by fishing in other areas with very little increase in effort. For catcher-processors in the AI, there is a range of potentially affected groundfish species, but fewer than seen in the EBS. The revenue at risk represents a small portion (1.48 percent) of the total status quo revenues for the relevant species for the catcher-processors in this area ($820,000 out of $55.38 million). As a result of the small at-risk portion of the total groundfish fishery in either the EBS or AI, no significant impacts to dependent communities related to catcher- processors are anticipated for any area.

C.3.5.3.2.4 Shoreside Processors

For shoreside processors, no substantial impacts are foreseen under this alternative because catcher vessel harvest levels are expected to remain constant, and no substantial change that would affect inshore delivery patterns in the fishery is forecast (although there may be some relatively minor redistribution of catch among individual vessels). Based on 2001 data, processors involved in the at-risk harvest are concentrated in Kodiak (with five to eight entities, depending on closure configurations), with a secondary concentration in Unalaska/Dutch Harbor (with one to five entities, depending on closure configurations). Four other communities each had a single processor that processed at least some groundfish from vessels with at-risk revenues under this alternative (Sand Point, King Cove, Homer, and Seward), while Akutan would have one or two entities, depending on closure configurations. As shown in Table 3.3-3, the total first wholesale value at risk of catch delivered inshore for processing represents approximately 1 percent of the total status quo value (about $149,000 out of $10.78 million) of the relevant fisheries of the CG area and far less than 1 percent in the AI and EBS areas, but no breakdown by port of landing is available. Caution must be exercised in the interpretation of these wholesale value data as (1) they are not additive with ex-vessel values presented above, and (2) they cannot be used as a proxy for potential levels of impacts to specific communities without considering the basic caveats laid out in the introductory paragraphs of Section C.3.3.3.2.4 of the Alternative 2 discussion. Given the very minor potential changes, however, no significant impacts are foreseen for any dependent community as a result of changes associated with processors under this alternative.

C.3.5.3.2.5 Multi-Sector Impacts

Multiple sector impacts are unlikely to be significant at the community level under Alternative 4. Among Alaska communities, only Kodiak participates in more that one sector with at-risk revenues and then with only two to three catcher vessels or catcher-processors and multiple locally operating shoreside processors. As noted, impacts to shoreside processors are anticipated to be insignificant, due to the low volumes at risk and the assumption that overall delivery patterns are unlikely to change under this alternative. Some additional Alaska resident crew positions on vessels owned elsewhere may have some compensation at risk, but overall potential for employment and wage or crew share compensation loss are small. Transient vessels owned outside of Alaska typically also make expenditures in ports of landing, which in this case would be concentrated in Kodiak (and, perhaps, Dutch Harbor). Given the assumption of general landing patterns remaining consistent, however, any vessel expenditure associated impacts are likely to be minor.

The potential for cumulative impacts is less straightforward. Even if the potential for social impacts under Alternative 4 would not be significant in isolation, this alternative would have the potential, nonetheless, to impose adverse cumulative impacts when evaluated in the context of other factors that are currently affecting North Pacific and EBS fisheries and fishing communities. Cumulative effects could include interactions with the social impacts of, among others, the near-shore closures put in place in 2001 to protect Steller sea lions, proposed rationalization of the BSAI crab and GOA groundfish fisheries, and the severe decline of salmon prices. These effects would likely be concentrated in communities with (relatively) significant dependence on small boat fleets and in communities that depend on both salmon harvesting and one or more of the fisheries that would be affected by the alternative.

C.3.6 Alternative 5A

Alternative 5A would amend the GOA and BSAI Groundfish FMPs to prohibit the use of NPT gear in designated areas of the EBS, AI, and GOA. In the GOA, NPT gear would be prohibited for all species in ten designated sites and for slope rockfish on the GOA slope between 200 and 1,000 m. In the EBS, the use of NPT gear would be prohibited for all species in 33 1/3 percent of five areas on a 5-year rotational basis. NPT gear used in other open areas of the EBS would require disks/bobbins on trawl sweeps and footropes. In the AI, NPT gear would be prohibited for all species in designated areas. For a more detailed description of the fishing impact minimization measures imposed by Alternative 5A, see EIS Section 2.3.3.

C.3.6.1 Benefits Associated with Alternative 5A

C.3.6.1.1 Passive-use Benefits

Under Alternative 5A, NPT fishing activities for all species in ten designated areas and for slope rockfish along the entire slope (200 to 1,000 m) in the GOA would be eliminated. Use of NPT gear would be closed over 33 1/3 percent of five areas in the EBS on a 5-year rotational basis, with bobbins required on NPT gear fished in other areas. The use of NPT gear would be prohibited for all species in designated areas of the AI. While it is not possible at this time to provide an empirical estimate of the passive-use value attributable to this level of protection of EFH, it is assumed that Alternative 5A would yield some incremental increase in the passive-use benefit of EFH over the status quo Alternative 1 (Table 3.6-1).

Alternative 5A would minimize the impact of NPT fishing over a total of 31,904 sq. km of GOA shelf and slope edge habitat (11.4 percent of the current 279,874 sq. km. of habitat), an average 63,975 sq. km of EBS habitat (8.0 percent of the current 798,870 sq. km. of habitat), and 32,235 sq. km of AI habitat (30.6 percent of the current 105,243 sq. km. of habitat), for a total of 128,114 sq. km., or 10.8 percent of the combined fishable area of 1,183,987 sq. km. (Table 1.4-1). Alternative 5A would further reduce NPT fishing impacts in the EBS by requiring disks and bobbins on trawl sweeps and footropes used in open areas. EIS Sections 2.3.3 and 4.3 details on the fishing impact minimization measures and the environmental consequences of Alternative 5A.

C.3.6.1.2 Use and Productivity Benefits

Alternative 5A would reduce the effects on EFH of NPT fishing in the GOA, EBS, and AI beyond measures currently in place or planned as part of other fishery management actions. Current scientific knowledge does not permit either a quantitative or qualitative assessment of the use benefits derived from minimizing the effects of fishing on EFH. However, the assumption implicit in the amendment to the Magnuson-Stevens Act requirement to minimize effects of fishing on EFH is that doing so would result in the sustained or enhanced production from FMP species and contribute to a healthy ecosystem (Table 3.6-1). As such, Alternative 5A would contribute additional measures that would further reduce the impacts of fishing on EFH.

C.3.6.2 Costs Associated with Alternative 5A

C.3.6.2.1 Industry Revenue at Risk

As above, assuming for sake of analysis that Alternative 5A had been implemented for the 2001 fishing year, it would have placed a total of $7.92 million to $10.90 million of gross revenue at risk in NPT fisheries in the GOA, EBS, and AI, or 4.4 to 6.0 percent of the status quo total revenue of $180.66 million to $181.30 million, depending upon which rotational areas are affected in the EBS (Table 3.6-1).

The 10 designated areas described under Alternative 5A in the GOA are discreet and widely spaced along the outer shelf and slope edge. Within the entire GOA there is substantial NPT fishing area adjacent to the 10 areas designated for protection where some of the revenue at risk might have been mitigated by a redeployment of fishing effort. However, Alternative 5A would have placed 31.8 percent of the 2001 status quo revenue at risk in the EG, an amount that would likely have been difficult to make up elsewhere. Amendment 58 to the GOA FMP, which took effect in 1998, prohibits trawling in the EG east of lat. 140° W. This leaves a very limited area within the EG where the revenue at risk for the NPT fisheries could be mitigated. There would likely have been some portion of the EG revenue at risk in 2001 that would not have been recovered under Alternative 5A rules.

Although some slope rockfish are caught with NPT gear at depths shallower than 200 m in the GOA, a majority of the NPT commercial catch of the slope rockfish complex occurs at depths in excess of 150 m (NMFS 2002d). There is limited fishing area for slope rockfish in the 150 to 200 m slope edge adjacent to the 200 to 1,000 m area designated for protection where revenue at risk might be mitigated, in whole or in part, by a redeployment of NPT fishing effort under Alternative 5A. Approximately 20 percent of the catch of the primary slope rockfish species, Pacific ocean perch, is historically taken by PTR gear fished by larger catcher-vessel and catcher-processor fleet components. Between 30 and 50 percent of the shortraker/rougheye rockfish in the slope rockfish complex is traditionally taken as incidental catch, with HAL gear, in the sablefish and halibut fisheries.

Under Alternative 5A, most, if not all, of the revenue at risk in the GOA might have been recovered by redeployment of fishing effort to adjacent areas or switching to PTR gear by most of the fleet components involved in the fishery. The smaller catcher-vessel fleet targeting slope rockfish almost exclusively uses NPT gear and has neither sufficient horsepower to fish PTR, nor the revenue from participation in this fishery to warrant the investment necessary to utilize PTR gear. The larger catcher vessels (vessels that also target pollock) and the catcher-processors either already have PTR gear available or have sufficient horsepower to convert to PTR to target slope rockfish. Under Alternative 5A, while the revenue at risk may be recovered by vessels fishing adjacent areas of the GOA not directly affected by the alternative or by switching to PTR gear within the protected areas, there would likely be a transference of catch share, and thus a transfer of revenue in the fishery from the smaller catcher-vessel fleet component to the larger catcher-vessel and catcher-processor fleet components. The magnitude of this transfer is impossible to estimate without specific knowledge of the fishing effort redeployment strategies that would actually be followed by the different fleet components.

Alternative 5A imposes a closure of NPT fishing in 33 1/3 percent of five areas, with each area rotating on a 5-year basis. These fishing impact minimization measures would, had they been implemented for the 2001 fishing year, have placed approximately 2.7 to 5.8 percent of the 2001 status quo revenue at risk, depending upon the rotation areas affected. The EBS revenue at risk would occur mainly in the catcher-processor fleet component. Some or all of the revenue at risk in the EBS might be capable of being mitigated by fishing with NPT gear in adjacent areas not affected by fishing impact minimization measures. However, there could be additional revenue placed at risk in the EBS under Alternative 5A by the requirement to use bobbins and disks on trawl sweeps for all NPT gear used in open areas. The amount of this additional revenue at risk is unknown.

In the AI, Alternative 5A would close designated areas to all species with NPT gear. Had it been the rule in 2001, it would have resulted in placing 3.0 percent of the status quo revenue in these fisheries at risk. The AI revenue at risk impacts under Alternative 5A would occur mainly in the catcher-processor fleet component and could potentially be mitigated, in whole or in part, by redeploying NPT fishing effort to adjacent areas not directly affected by the alternative.

C.3.6.2.2 Product Quality and Revenue Impacts

Revenue impacts from changes in product quality would be possible under Alternative 5A, particularly for the smaller catcher-vessel fleet component operating with NPT gear in the GOA. These vessels may be required to expend additional fishing effort in an attempt to recover the revenue at risk, which could lengthen fishing trips and result in diminished product quality. Product quality may not be affected in the catcher-processor fleet component, since these vessels process the catch onboard the vessel, unless, for example, the average size fish in the catch changed substantially.

C.3.6.2.3 Operating Cost Impacts

Operating cost impacts under Alternative 5A may likely be greater overall for both the GOA catcher-vessel component and catcher-processor fleet components in all areas. CPUE of slope rockfish caught with PTR gear and with NPT gear at depths shallower than 200 m along the GOA slope edge may be lower than the CPUE of NPT gear in the depth range of 200 m and greater where these species are normally fished. This may result in increased fishing effort and associated increased operational costs to mitigate the catch and revenue at risk.

Larger catcher vessels and catcher-processors in the GOA have the option of changing to PTR gear for targeting slope rockfish. However, the smaller catcher vessels, particularly the 18.3 m (60 feet) and smaller vessels, do not have sufficient horsepower to effectively switch to PTR fisheries, and the equipment costs would likely be prohibitive, given the annual revenue of these vessels. Operational costs for the catcher-processor fleet component may increase due to the redeployment of fishing effort necessary to mitigate the 17.6 percent of the status quo revenue placed at risk for this fleet component.

Catcher-processors operating in the EBS NPT flathead sole fishery could have increased operational costs under Alternative 5A due to increased running time to reach northern fishing areas when the more southerly areas are closed, and possibly due to increased fishing effort to make up the revenue at risk in these fisheries (Table 3.6-1). It is impossible to estimate the increase in operational costs without fully understanding the fishing effort redeployment strategy that the operators would actually follow. Undoubtedly, had Alternative 5A been in place in 2001, there would have been efforts to mitigate the 11.8 to 29.3 percent of the status quo revenue placed at risk in the NPT fishery for flathead sole in that year. Alternative 5A would require the use of bobbins and disks on NPT footropes and trawl sweeps used in open areas. The use of bobbins and disks may reduce the CPUE of some bottom-dwelling species such as flatfish, resulting in increased fishing time and associated increased operational costs to attain the status quo catch and revenue in these fisheries. This operational impact would occur primarily in the catcher-processor fleet component in the EBS.

In the AI, Alternative 5A would have placed a relatively small amount, 3.0 percent, of the 2001 status quo revenue at risk and may not have resulted in any significant increases in operating costs for either catcher-vessel or catcher-processor fleet components.

C.3.6.2.4 Safety Impact

Alternative 5A may not significantly affect the safety of any of the fleet components in the GOA, because fishing effort would likely be redeployed to adjacent fishing areas (Table 3.6-1).

In the EBS, catcher-processors targeting flathead sole, other flatfish, and Pacific cod would be restricted from fishing some areas closer to their home ports during some time periods, depending upon the area affected by the rotational closures to NPT gear. When more southerly areas are closed, vessels fishing NPT gear would have to travel farther north and farther from ports of call, possibly increasing safety impacts.

Alternative 5A may not significantly affect the safety of any of the fleet components in the AI, because fishing effort would likely be redeployed to adjacent fishing areas within similar distance of their home port.

C.3.6.2.5 Impacts on Related Fisheries

There may be an impact on related fisheries in the GOA from Alternative 5A, because a substantial amount of NPT fishing effort for slope rockfish would likely be redeployed into adjacent areas shallower than 200 m that would not be directly affected by the alternative. Other fisheries occur in these areas, including halibut longline, Pacific cod longline (if open), and other NPT fisheries such as shallow water flatfish. Increased NPT fishing effort at depths less than 200 m along the GOA shelf edge could have negative indirect economic impacts on these fisheries (Table 3.6-1).

There may be impacts on related fisheries from Alternative 5A in the EBS and AI as vessels using NPT gear are displaced into adjacent areas where other gear groups such as HAL and POT vessels may be operating.

C.3.6.2.6 Costs to Consumers

Some impact on consumers from Alternative 5A may occur because although some or all of the revenue at risk may be recovered by redeployment of fishing efforts, there would likely be some operational cost increases for the fleet components (Table 3.6-1). Operational cost increases may result in a measurable increase in the price to consumers of species caught in fisheries directly or indirectly affected by the redeployment of fishing effort. There may also be attributable costs imposed on consumers from changes in availability of supply, product mix, and/or product quality.

C.3.6.2.7 Management and Enforcement Costs

Management and enforcement costs may increase under Alternative 5A, although it is not possible to estimate by what amount. Additional on-water enforcement could be required to assure compliance with the fishing impact minimization measures applied in the GOA, EBS, and AI (Table 3.6-1). Section 3.1.2.7 contains some additional discussion of the NOAA Enforcement and Coast Guard responses to resource demands connected with monitoring and enforcing provisions of Alternative 5A.

Although not specifically required by the alternative, VMS equipment or 100 percent observer coverage might be needed on all vessels using NPT gear in the GOA, EBS, and AI to assure compliance with Alternative 5A. Most groundfish vessels operating in the GOA, EBS, and AI for pollock or Pacific cod fishery are already equipped with VMS. Vessels not equipped with VMS systems might need to install and operate the VMS equipment during NPT fisheries in all areas. The number of additional vessels that might need to add VMS equipment under Alternative 5A is not known. Alternative 5A fishing impact minimization measures are specific to gear (NPT) and may require additional enforcement measures (boarding and inspection) beyond the typical time/area/fishery management measures currently employed in the GOA.

Although only fishing impact minimization measure Alternative 5B specifically requires the development and implementation of a research and monitoring program, some level of research and monitoring of the effectiveness of the alternative would likely occur under any alternative adopted. Accomplishing these research and monitoring projects would require significant additional expenditures by the Alaska Region and Alaska Fisheries Science Center over a period of years.

C.3.6.3 Distributional Impacts

C.3.6.3.1 Gross Revenue at Risk Effects

C.3.6.3.1.1 Geographic Area Impacts

Alternative 5A imposes fishing impact minimization measures in the GOA, EBS, and AI. Adopting the analytical convention that Alternative 5A was in place for the 2001 fishing year, within the GOA, the largest amount of revenue at risk would have been in the CG, with $2.55 million in revenue at risk, equaling 12.3 percent of the $20.69 million 2001 status quo revenue in the CG (Table 3.6-2). The revenue at risk in WG would have equaled $810,000, or 13.0 percent of the 2001 total status quo revenue of $6.25 million. There would have been $240,000 in revenue at risk in the EG, or 31.8 percent of the $760,000 status quo revenue.

In the EBS, Alternative 5A would have placed between $2.63 million and $5.61 million of revenue at risk, or 2.7 to 5.8 percent of the $96.27 million to $96.91 million status quo revenue in the fisheries affected, had this rule been in effect that year.

In the AI, $1.69 million of revenue would have been placed at risk, or 3.0 percent of the $56.70 million status quo revenue in the affected fisheries, in 2001.

C.3.6.3.1.2 Fishery Impacts

In the GOA, Alternative 5A would have affected a number of NPT fisheries, but primarily fisheries targeting rockfish and Pacific cod. The total revenue at risk in the NPT rockfish fishery would have been $2.82 million, or 30.1 percent of the status quo revenue of $9.36 million in 2001 (Table 3.6-2). The total revenue at risk in the GOA NPT Pacific cod fishery (mainly from the catcher-vessel fleet component) would have been $380,000 or 4.9 percent of the status quo revenue of $7.66 million.

Alternative 5A would have placed revenues at risk in a number of NPT target fisheries in the EBS, including flathead sole, yellowfin sole, rock sole, other flatfish, Pacific cod, and others. However, the largest revenue at risk would have occurred in the flathead sole fishery, where $1.70 million to $4.23 million of revenue would have been at risk, or 11.8 to 29.3 percent of the $14.46 million 2001 status quo revenue, depending upon the rotational area affected. The total revenue that would have been at risk in the EBS NPT Pacific cod fishery ranges from $190,000 to $980,000, or 1.3 to 6.8 percent of the 2001 status quo revenue of $14.33 million.

In the AI, Alternative 5A would have placed revenue at risk in NPT fisheries for Atka mackerel, flatfish, Pacific cod, and rockfish. The largest revenue at risk in the AI would have been in the NPT rockfish fishery, where $1.09 million, or 20.2 percent of that year's total status quo revenue value of $5.4 million, would have been placed at risk. The impact on the Atka mackerel fishery would have put $200,000 at risk, or 0.5 percent of the $41.16 million status quo value in this fishery in 2001.

C.3.6.3.1.3 Fleet Component Impacts

In the GOA, the catcher-processor fleet would have had the greatest amount of revenue at risk, equaling $2.70 million, or 17.6 percent of the status quo total revenue. The catcher-vessel fleet would have had $900,000 of ex-vessel revenue at risk, or 7.3 percent of the total ex-vessel revenue of $12.31 million (Table 3.6-2). Under Alternative 5A, had it been in place in 2001, the catcher-vessel fleet would have had revenue at risk in the EG of $60,000, or 20.8 percent of status quo; in the CG, $470,000, or 4.9 percent of status quo; and in the WG, $360,000, or 16.0 percent of status quo. The GOA catcher-processor fleet would have had revenue at risk mainly in the CG ($2.07 million, or 18.9 percent of status quo), but also in the WG ($450,000, or 11.3 percent of the $4 million status quo gross revenue) and the EG ($180,000 or 39.3 percent of the $450,000 status quo revenue).

In the EBS, substantially all of the revenue at risk would have occurred in the catcher-processor fleet component. A total of $2.63 million to $5.61 million of revenue would have been at risk in the 2001 fishery, or 2.9 to 6.2 percent of the $90.45 million to $91.08 million status quo revenue, depending upon the rotational areas affected.

In the AI, the catcher-processor NPT fleet would have accounted for substantially all of the $1.69 million revenue at risk, or 3.1 percent of the 2001 total status quo revenue of $55.38 million.

C.3.6.3.2 Impacts on Dependent Communities

C.3.6.3.2.1 Overview

Unlike the previous alternatives, impacts to dependent communities may be significant at the community level, at least for a couple of communities (King Cove and Sand Point), under Alternative 5A. Adverse impacts to individual operations may occur in other communities (especially Kodiak), but these impacts are considered unlikely to be significant at the community level, due to the low magnitude of the impacts relative to the overall operations of the affected fleet and processing entities (as well as the overall community fishing sectors).

The only fisheries directly affected by Alternative 5A would be groundfish fisheries. Similar to Alternative 4 (but unlike Alternatives 2 and 3), groundfish species in addition to rockfish would be affected by this alternative. Like Alternative 4, this alternative would have impacts on GOA, EBS, and AI fisheries. Like Alternatives 2, 3, and 4, the only gear group directly affected for both catcher vessels and catcher-processors would be non-pelagic trawl. Using 2001 fleet data, 82 to 89 vessels (catcher vessels and catcher-processors combined) would be affected by this alternative: 25 to 32 in Alaska, 12 to 13 from Oregon, 38 to 40 from Washington, and 6 from other states. Using 2001 processor data, between 16 and 21 shoreside processors in Alaska would potentially be affected by this alternative, depending on specific closure configurations.

C.3.6.3.2.2 Catcher Vessels

Based on 2001 data, within Alaska, ownership of catcher vessels harvesting relevant groundfish species with at-risk revenue is concentrated in the Aleutians East Borough (AEB) with 17 vessels (King Cove with 8 vessels and Sand Point with 9), and Kodiak with 6 to 13 vessels. (Anchorage and Girdwood ownership accounted for an additional vessel each.) Unlike other alternatives, which featured only large (over 60 feet) vessels with revenue at risk, this alternative has both large and small vessels with revenue at risk. All but two of the AEB vessels with at-risk revenues are under 60 feet, while none of the Kodiak vessels is a small vessel. The two other Alaska-owned vessels include one large and one small vessel. Ownership in the Pacific Northwest is largely confined to large vessels, with 17 to 30 vessels from Washington (including two small vessels) and 12 to 13 vessels from Oregon (with no small vessels).

Under Alternatives 2, 3, and 4, GOA impacts to catcher vessels were confined to the CG area. Under Alternative 5A, catcher vessels would have had at-risk catch in the EG, the CG, and the WG. At-risk harvest would not have been evenly distributed among the GOA areas, ranging from 20.85 percent in the EG, to 4.86 percent in the CG, to 16.04 percent in the WG, based upon 2001 fishery performance. However, since the CG accounts for 79 percent of harvest among relevant catcher vessels in the entire GOA under status quo conditions, the at-risk percentage of total catch for the entire GOA is only 7.30 percent for all affected catcher vessels. Total status quo harvest in the EG is $310,000 and the WG is $2.24 million, compared to $9.76 million in the CG. At-risk revenue is about $900,000. Fisheries with greater than negligible (0.1 percent in this case) at-risk amounts in the GOA include deep water flatfish (3.4 percent), Pacific cod (5.1 percent), pollock-bottom trawl (9.1 percent), and rockfish (18.8 percent). For the affected catcher fleet as a whole, the revenue at risk represents about 2 percent of the ex-vessel value of their total harvest from all fisheries in which they participate (and about 3 percent of total groundfish ex-vessel value in particular). As noted elsewhere, figures given for catcher vessels represent ex-vessel revenues, which would tend to understate the overall value to associated communities that derive benefits from both harvesting and processing activities if examined alone. Values for first wholesale revenues at risk by shoreside processors from landings of catcher vessels are referenced in the discussion of shoreside processor locations provided below. There are, however, variations within the fleet in terms of the community distribution of effort among fisheries. Almost twice as many catcher vessels participate in the pollock and cod fisheries as participate in the rockfish fisheries, and the smaller catcher vessels that are concentrated in King Cove and Sand Point do not participate in the rockfish fisheries. King Cove vessels affected by this alternative have 5.4 percent of the value of their total harvest at risk, almost all of it pollock. Sand Point vessels affected by this alternative have 3.3 percent of their revenue at risk, about three-fourths of which is Pacific cod and one-fourth pollock. Affected Kodiak boats have only 2 percent of their revenue at risk under this alternative, primarily from Pacific cod.

The amount of revenue at risk that would likely be lost under actual conditions varies considerably by community. The smaller catcher boats of King Cove and Sand Point would be placed more at risk by any restrictions on their fishing activity than larger catcher vessels of other communities. Larger vessels from Kodiak and the Pacific Northwest communities can generally fish the EBS and the AI waters more easily than boats from King Cove and Sand Point. As discussed in the sector and regional groundfish profiles for King Cove and Sand Point (http://www.fakr.noaa.gov/npfmc/), many fishing operations are organized around a fleet of 58-foot salmon boats with multi-gear capability. This fleet historically has made a living through diversification, participating in a combination of groundfish (Pacific cod, pollock, other), halibut, crab, and salmon fisheries – with each comprising no more than 30 or 40 percent of total earnings. With the recent decline in the crab and salmon fisheries, groundfish have assumed great importance for these vessels – up to 75 percent of a vessel's ex-vessel income in recent years. Whereas salmon used to account for a third of a vessel's income, it now produces perhaps a tenth of the boat's ex-vessel returns. Crab returns have declined from up to 14 percent of a boat's earnings to 4 or 5 percent – if the boat continues to take crab at all. Halibut is an important but variable component of a vessel's suite of fisheries. Since halibut is now an IFQ fishery, it is relatively expensive to buy into participation, especially for fishermen experiencing declining crab and salmon fisheries. The King Cove and Sand Point vessels fishing halibut are essentially those that qualified for the initial allocation of IFQs.

Boats from King Cove and Sand Point differ in their groundfish emphasis. King Cove boats catch a lot of Pacific cod and very little pollock. Sand Point boats have (through 2001, the most recent statistical year for which complete data are available) harvested more pollock than Pacific cod. Both fleets depend on closer and more protected fishing waters. They are less able, compared to larger vessels, to travel longer distances to find alternative fishing areas. These vessels face an inherent competitive disadvantage, compared to larger vessels, because they must stay tied up during heavy weather, when larger boats can fish. Closures of relatively close fishing grounds would impose additional costs on these vessels compared to vessels from Kodiak and the Pacific Northwest. In conjunction with the decline of other fisheries, the effects on vessels from these communities could be significant. Each community has essentially only one processor, and this restricted local market also places constraints on the local fleet. As a result of all of these factors, the communities of King Cove and Sand Point may experience significant impacts under this alternative, depending on the success of strategies to replace at-risk revenues.

Affected catcher vessels from Washington and Oregon closely resemble those from Kodiak, but with an even higher dependence on Pacific cod and pollock. Together, Pacific cod and pollock account for over 80 percent of ex-vessel payments to the boats, with Pacific cod again predominating. Based on 2001 data, Oregon-based boats operating in the EEZ off Alaska harvest proportionally more of their total FMP catch from the areas that would be closed by this alternative than is the case for vessels from other regions, but little more can be gleaned from the available information. The revenue at risk represents about 3 percent of the total ex- vessel payments paid to boats from Oregon, and less than 1 percent of those paid to Washington boats. Assuming that at least some at-risk revenue can be made up with minimal costs by altering fishing areas or approaches, it is not likely that these operations would experience significant impacts under this alternative.

For catcher vessels operating in the EBS and AI, the only affected species is Pacific cod. For both the EBS and AI, revenue at risk under this alternative is 0.1 percent or less of the total status quo revenues of the affected vessels for each area (less than $2,000 out of $5.82 million and $1.32 million, respectively). As a result of the negligible at-risk portion of the catcher-vessel harvest of any groundfish fishery in either the EBS or AI, no significant impacts to dependent communities related to catcher vessels in these areas are anticipated.

C.3.6.3.2.3 Catcher-Processors

Based on 2001 data, ownership of catcher-processors with at-risk revenue is concentrated in Washington (with 15 to 19 vessels). Alaska ownership is exclusive to Kodiak (two to three vessels). Four vessels are owned in other states.

For catcher-processors, revenue at risk in the GOA is 17.6 percent under this alternative, and this is not evenly distributed among the various areas within the GOA. Revenue at risk in the EG is relatively modest in terms of total value ($180,000 out of a status quo revenue for affected vessels of $450,000), but this is relatively large in percentage terms (39.3 percent). For the CG, revenue at risk is 18.9 percent of the total ($2.07 million out of $10.93 million), while the analogous figure for the WG is 11.3 percent ($450,000 out of $4 million). The GOA total revenue associated with a number of species is potentially at risk, but only for a few species in greater than negligible (0.3 percent in this case) amounts. These are deep water flatfish (2.2 percent), flathead sole (1.1 percent), rex sole (7.3 percent), and rockfish (33.8 percent). Except for rockfish, it is assumed that all at-risk revenues for all species could easily be recovered with minimal efforts in other areas, due to the very low at-risk percentages involved. The catcher-processors involved in the at-risk rockfish harvest are head and gut vessels.

For the EBS, catcher-processors under Alternative 5A would experience revenue at risk associated with a number of different groundfish species (risk would vary by the specific rotational closure in place at any given time). The fisheries that have a revenue at risk greater than 1 percent include arrowtooth flounder (0.5 to 2.8 percent of a status quo value of $3.38 million), flathead sole (11.8 to 29.3 percent of $14.46 million), Greenland turbot (0.5 to 11.2 percent of $500,000 to $1.12 million), Pacific cod (2.2 to 11.5 percent of $8.50 million), rockfish (7.2 to 27.2 percent of $160,000 and other (11.6 to 27.9 percent of $170,000 to $180,000). Many of these species, however, have a relatively low overall value to the catcher-processor sector. As a result, relatively large percentage declines may have minimal impacts on the sector (and associated communities). Of all of the species with at-risk revenues greater than 1 percent of total value, the only species with at-risk revenues greater than $100,000 are flathead sole ($1.70 million to $4.23 million), Pacific cod ($190,000 to $980,000), and Greenland turbot ($120,000 to $130,000). The catcher-processors harvesting and processing these species include head and gut vessels, as well as some pollock vessels that fill in with these fisheries.

For the AI, catcher-processors under Alternative 5A would experience revenue at risk associated with a number of different groundfish species. While many of these species have a relatively high percentage of revenue at risk, the overall value at risk is comparatively low. Revenue of $10,000 or greater is at risk for only five species: Atka mackerel ($200,000 at risk, which is 0.5 percent of status quo revenue of affected vessels), Greenland turbot ($190,000, 51.0 percent of status quo revenue), Pacific cod ($130,000, 1.6 percent of status quo revenue), rock sole ($60,000, 42.8 percent of the status quo revenue) and rockfish ($1.09 million, 20.2 percent of status quo revenue). It is assumed that, given the small percentage of total catch at risk, catcher-processors could make up for revenue at risk for the Atka mackerel and Pacific cod fisheries. Further, the absolute value of the rock sole revenue at risk ($60,000) is low enough that community level impacts are unlikely. This leaves the Greenland turbot and rockfish revenue shortfalls as being somewhat more problematic. Similar to the pattern seen in the EBS, the AI catcher-processors harvesting and processing the at-risk harvest for these species are head and gut boats along with some pollock-oriented vessels filling in during non-pollock periods.

The information available indicates that most of the revenue at risk is borne by affected Washington area catcher-processors (80 percent) and that this represents about 3 percent of their combined total catch valuation from all fisheries in which they participate. Affected catcher-processors from non-Washington locations bear about 20 percent of the revenue at risk, which is about 6 percent of their total catch valuation (double the proportion of the Washington vessels), and this may be a low estimate. Catcher-processors affected by this alternative and owned by residents of Washington harvest pollock extensively (about 75 percent of total catch valuation), while catcher-processors from other regions focus more on cod (66 percent of total catch valuation).

Due to confidentiality restrictions based on a small number of participating entities, revenue information for Alaska-based catcher-processors with revenue at risk cannot be disclosed for this alternative. It is known, however, that impacts accruing in Alaska would be concentrated in Kodiak. Given the small number of entities involved, the relative size of the local fishery-based economy, and what is known about the relative order of magnitude of overall impacts to the fleet, it is assumed that community level impacts associated with catcher-processors would be significant. In the case of Washington communities, while individual Washington-owned entities may experience adverse impacts under this alternative, it is assumed that community level impacts would be significant under this alternative due to the scale of the local economy in those communities.

C.3.6.3.2.4 Shoreside Processors

For shoreside processors, no substantial impacts are foreseen under this alternative for EBS and AI fisheries because catcher-vessel harvest levels are expected to remain constant, and no substantial change in the fishery is forecast. In the GOA, with processor dependence on a wider variety of fisheries, potential interactive impacts are more complex. Based on 2001 data, processors involved in the at-risk harvest are concentrated in Kodiak (with six to eight entities, depending on closure configurations), although a number of other communities had processed at least some groundfish from vessels with at-risk revenues under this alternative (including some communities in Southeast Alaska, unlike Alternatives 2, 3, and 4). These were Unalaska/Dutch Harbor (two to four processors) and King Cove (one to two processors), along with seven others with one processor each (Akutan, Sand Point, Moser Bay [Kodiak Island Borough], Chignik, Sitka, Cordova, and Petersburg). As shown in Table 3.3-3, the total first wholesale value at risk of catch delivered inshore for processing represents approximately 8 percent of the total status quo value ($3.28 million out of $42.25 million) of the relevant fisheries of the GOA area, well below 1 percent for the AI and EBS areas, and about 6 percent for all areas combined (about $3.28 million out of $58.59 million), but no breakdown by port of landing is available. Caution must be exercised in the interpretation of these wholesale value data as (1) they are not additive with ex-vessel values presented above, and (2) they cannot be used as a proxy for potential levels of impacts to specific communities without considering the basic caveats laid out in the introductory paragraphs of Section C.3.3.3.2.4 of the Alternative 2 discussion. Processor-associated impacts to dependent communities could be significant in some of the smaller communities in the WG area, due primarily to potential impacts to local catcher-vessel fleets. However, as discussed earlier, the magnitude of these impacts would depend on the success of local fleet mitigation strategies that are not known at this time. Further, data to quantify the potential magnitude of these impacts on shore processors in the individual communities are confidential. No significant community impacts are anticipated for any other dependent communities.

C.3.6.3.2.5 Multi-Sector Impacts

Multiple sector impacts may be significant at the community level under Alternative 5A. Among Alaska communities, Kodiak, King Cove, and Sand Point participate in more that one sector with at-risk revenues. Kodiak is home to 6 to 13 locally owned catcher vessels, 2 to 3 locally owned catcher-processors, and some 6 to 8 locally operating shoreside processing entities with at least some revenue at risk, depending on closure configurations. Neither King Cove nor Sand Point is home to locally owned catcher-processors, but both have multiple locally owned catcher vessels (eight and nine vessels, respectively) and have at least one dominant local processor with at least some revenue at risk under this alternative. Revenue at risk for King Cove and Sand Point catcher vessels is a higher percentage of total overall ex- vessel revenues (at 5.4 and 3.3 percent, respectively) than is the case in Kodiak (about 2 percent), and these vessels represent a much larger proportion of the total community fleet in King

Cove and Sand Point than do the affected vessels in Kodiak. Given the smaller vessels in King Cove and Sand Point (with less flexibility of response), the higher proportion of revenue at risk, the higher proportion of the fleet with revenue at risk, and the known challenges that these fleets (and communities) are facing with other fisheries, the WG communities of King Cove and Sand Point may have experienced social impacts from this alternative that would be significant at the community level. Other Aleutians East Borough communities that derive benefits from revenues generated through borough raw fish taxes on landings in King Cove and Sand Point may experience impacts. These impacts to other borough communities would, however, probably not have been significant as the overall quota would have been unchanged, and no changes in landing patterns would have been expected at the regional level. Individual Kodiak entities may experience adverse impacts under this alternative, but impacts at the community level are considered unlikely to rise to a level of significance given the small proportion of revenue at risk for the affected catcher vessels, the low volumes at risk, and the assumption that overall delivery patterns are unlikely to change for Kodiak based shoreside processors under this alternative. Some additional Alaska resident crew positions on vessels owned elsewhere, but that spend at least part of the year in Alaska ports, may have some compensation at risk. Transient vessels owned outside of Alaska typically also make expenditures in ports of landing, which in this case would be concentrated in Kodiak (and, perhaps, Dutch Harbor). Given the assumption that overall delivery patterns for the community are unlikely to change, however, any vessel expenditure associated impacts are likely to be minor.

The potential for cumulative impacts is less straightforward. Even if the potential for social impacts under Alternative 5A would not be significant in isolation, this alternative would have the potential, nonetheless, to impose adverse cumulative impacts when evaluated in the context of other factors that are currently affecting North Pacific and EBS fisheries and fishing communities. Cumulative effects could include interactions with the social impacts of, among others, the near-shore closures put in place in 2001 to protect Steller sea lions, proposed rationalization of the BSAI crab and GOA groundfish fisheries, and the severe decline of salmon prices. These effects would likely be concentrated in communities with (relatively) significant dependence on small boat fleets and communities that depend on both salmon harvesting and one or more of the fisheries that would be affected by the alternative.

C.3.7 Alternative 5B

Alternative 5B would amend the GOA and BSAI Groundfish FMPs to prohibit the use of NPT gear in designated areas of the EBS, AI, and GOA. In the GOA, NPT gear would be prohibited for all species in 10 designated sites and for slope rockfish on the GOA slope between 200 and 1,000 m. In the EBS, the use of NPT gear would be prohibited for all species in 33 1/3 percent of five areas on a 5-year rotational basis. NPT gear used in other open areas of the EBS would require disk/bobbins on trawl sweeps and footropes. In the AI, NPT gear would be prohibited for all species in designated areas extending to the limits of EEZ, and additional closures would occur in areas of high coral and sponge bycatch. TACs in NPT fisheries would be reduced by the 1998 to 2002 average annual historical weights of target species caught in the designated closure areas and in the coral and sponge closure areas. Additional measures imposed by Alternative 5B in the AI include 100 percent observer coverage and VMS on all groundfish vessels using NPT gear and the development of a comprehensive research and monitoring system. For a more detailed description of the fishing impact minimization measures imposed by Alternative 5B, see EIS Section 2.3.3.

C.3.7.1 Benefits Associated with Alternative 5B

C.3.7.1.1 Passive-use Benefits

Under Alternative 5B, NPT fishing activities for all species in 10 designated areas, and for slope rockfish along the entire slope (200 to 1,000 m) in the GOA, would be eliminated. Use of NPT gear would be closed over 33 1/3 percent of five areas in the EBS on a 5-year rotational basis, with bobbins required on NPT gear fished in other areas. The use of NPT gear would be prohibited for all species in designated areas of the AI. While it is not possible at this time to provide an empirical point estimate of the passive-use value attributable to this protection of EFH, it is assumed that Alternative 5B would yield some incremental increase in the passive-use benefit of EFH over the no action Alternative 1 (Table 3.7-1).

Alternative 5B would reduce the impact of NPT fishing over a large area of habitat in the GOA, EBS, and AI. However, the current distribution of fishing effort does not extend to the edge of the EEZ. Thus, fishing impacts on EFH would actually be minimized over 31,904 sq. km of GOA shelf and slope edge habitat (11.4 percent of the current 279,874 sq. km of habitat) and an average 63,975 sq. km of EBS habitat (8.0 percent of the current 798,870 sq. km of habitat), as in Alternative 5A. Alternative 5B would further reduce NPT fishing impacts in the EBS by requiring disks and bobbins on trawl sweeps and footropes used in open areas. In the AI, Alternative 5B would reduce the impact of NPT fishing over 82,023 sq. km of AI habitat, or 77.9 percent of the current fishable area of 105,243 sq. km in the AI. Overall, Alternative 5B would affect 177,903 sq. km, or 15.0 percent of the combined fishable area of 1,183,987 sq. km in the GOA, EBS, and AI. (See EIS sections 2.3.3 and 4.3 for details on fishing impact minimization measures and the environmental consequences of Alternative 5).

C.3.7.1.2 Use and Productivity Benefits

Alternative 5B is designed to reduce the effects on EFH of NPT fishing in the GOA, EBS, and AI. These fishing impact reductions would extend beyond measures currently in place or planned as part of other fishery management actions. Current scientific knowledge does not permit either a quantitative or qualitative assessment of the use benefits that would be derived from minimizing the effects of fishing on EFH. However, the assumption implicit in the amendment to the Magnuson-Stevens Act requirement to minimize effects of fishing on EFH is that doing so would result in the sustained or enhanced production from FMP species and contribute to a healthy ecosystem (Table 3.7-2). As such, Alternative 5B would contribute additional measures that would further reduce the impacts of fishing on EFH.

C.3.7.2 Costs Associated with Alternative 5B

C.3.7.2.1 Industry Revenue at Risk

Alternative 5B, had it been in place for the 2001 fishing year, would have placed a total of $12.94 million to $15.93 million of gross revenue at risk in NPT fisheries in the GOA, EBS, and AI, or 7.2 to 8.8 percent of the status quo total revenue of $179.77 million to $180.41 million, depending upon which rotational areas are affected in the EBS (Table 3.7-1). In the AI, there would have been reductions in TACs for NPT target species that would reduce gross revenue in the catcher-vessel and catcher-processor fleet components.

Based on recent harvests from within the fishing impact minimization areas in the AI, the 2003 Atka mackerel trawl TAC of 45,649 mt would have been reduced, under this rule, by 6 percent, or 2,739 mt, resulting in the a complete loss of $2.73 million in first wholesale revenue. The 2003 trawl caught rockfish TAC in the AI of 18,254 mt would have been reduced by 12 percent, or 2,190 mt, resulting in a complete loss of $1.10 million in first wholesale gross revenue. Since the Pacific cod TAC is allocated for both the AI and EBS combined, it is assumed that the combined area TAC for trawl-caught Pacific cod would be reduced by 10 percent, or 9,021 mt, from the 90,210 mt 2003 TAC, under 5B rules. Using the recent historical P. cod catch rates of 25 percent in the AI and 75 percent in the EBS, this would have resulted in a total loss in first wholesale revenue of $8.50 million in the EBS and $2.83 million in the AI, for a total of $11.34 million, in the 2001 fishery. The reduction in revenue from the EBS and AI from TAC reductions, under Alternative 5B would have totaled $15.16 million, with an $8.05 million reduction in revenue in the EBS and a $6.66 million in the AI.

The 10 designated areas described under Alternative 5B in the GOA are discreet and widely spaced along the outer shelf and slope edge. Within the entire GOA, there is substantial NPT fishing area adjacent to the 10 designated areas where the revenue at risk might be mitigated by a redeployment of fishing effort. However, had Alternative 5B been in effect in 2001, it would have placed 31.8 percent of the status quo revenue at risk in the EG. That large a revenue at risk would have been difficult to fully make up. Amendment 58 to the GOA FMP, which took effect in 1998, prohibits trawling in the EG, east of lat. 140° W. This leaves a very limited area within the EG where the revenue at risk for the NPT fisheries could be mitigated. It is likely that some portion of the EG revenue at risk would not have been recovered under Alternative 5B.

Although some slope rockfish are caught with NPT gear at depths shallower than 200 m in the GOA, a majority of the NPT commercial catch of the slope rockfish complex occurs at depths in excess of 150 m (NMFS 2002d). There is limited fishing area for slope rockfish in the 150 to 200 m slope edge adjacent to the 200 to 1,000 m area, designated for protection, where the revenue at risk might be mitigated by a redeployment of NPT fishing effort under Alternative 5B. Approximately 20 percent of the catch of the primary slope rockfish species, (i.e., Pacific ocean perch,) is taken by PTR fished by larger catcher-vessel and catcher-processor fleet components. Between 30 and 50 percent of the shortraker/rougheye rockfish in the slope rockfish complex is taken incidentally, by HAL gear, in the sablefish and halibut fisheries.

Under Alternative 5B, most, if not all, of the revenue at risk in the GOA might be recovered by redeployment of fishing effort to adjacent areas, or by switching to PTR gear by most of the fleet components involved in the fishery. The smaller catcher-vessel fleet targeting slope rockfish almost exclusively uses NPT gear and has neither sufficient horsepower to fish PTR, nor the revenue from participation in this fishery to warrant the investment necessary to utilize PTR gear. The larger catcher vessels (vessels that also target pollock) and the catcher-processors either already have PTR gear available or have sufficient horsepower to convert to PTR to target slope rockfish. Under Alternative 5B, while the revenue at risk might be recovered by vessels fishing adjacent areas in the GOA, or by switching to PTR gear within the protected areas, there could be a transference of catch share and, thus, a transfer of revenue in the fishery, from the smaller catcher-vessel fleet component to the larger catcher-vessel and catcher-processor fleet components. The magnitude of this transfer is impossible to estimate without specific knowledge of the redeployment fishing effort strategies that would actually be followed by the different fleet components.

Alternative 5B imposes a closure of NPT fishing in 33 1/3 percent of five areas, with each area rotating on a 5-year basis. These fishing impact minimization measures would, had they been in place in 2001, have placed approximately 2.7 to 5.8 percent of the status quo revenue at risk, depending upon the rotation areas affected. The EBS revenue at risk would occur mainly in the catcher-processor fleet component. Some portion or all of the revenue at risk in the EBS might be made up by fishing with NPT gear in adjacent areas not directly affected by Alternative 5B. However, there could be additional revenue placed at risk in the EBS under Alternative 5B by the requirement to use bobbins and disks on trawl sweeps for all NPT gear used in open areas. The amount of increased revenue that could be placed at risk is unknown.

In the AI, under Alternative 5B, NPT gear would be prohibited for all species in designated areas, and additional closures would occur in areas of high coral and sponge bycatch. TACs in NPT fisheries would be reduced by the 1998 to 2002 average historical amounts of target species caught in the designated closure areas and in coral and sponge closure areas. Under Alternative 5B, revenue would be placed at risk in both catcher-vessel and catcher-processor fleet components for NPT fisheries.

C.3.7.2.2 Product Quality and Revenue Impacts

Revenue impacts from changes in product quality would be possible under Alternative 5B, particularly for the smaller catcher-vessel fleet component operating with NPT gear in the GOA. These vessels may be required to expend additional fishing effort in their attempt to recover a portion of the revenue at risk, which may lengthen fishing trips and result in diminished product quality. Product quality may not be affected in the catcher-processor fleet component, since these vessels process the catch onboard the vessel. Product quality could be affected, however, if the average size or condition of the fish changes significantly.

C.3.7.2.3 Operating Cost Impacts

Operating cost impacts under Alternative 5B may be greater overall for both the GOA catcher-vessel component and catcher-processor fleet components in all areas. CPUE of slope rockfish caught with PTR gear and with NPT gear at depths shallower than 200 m along the GOA slope edge could be lower than the CPUE of NPT gear in the depth range of 200 m and greater where these species are normally fished. This would likely result in increased fishing effort and associated operational costs to make up the catch and revenue at risk.

Larger catcher vessels and catcher-processors in the GOA have the option of changing to PTR gear for targeting slope rockfish. However, the smaller catcher vessels, particularly the 18.3 m (60 feet) and smaller vessels, do not have sufficient horsepower to switch to PTR fisheries, and the equipment costs would likely be prohibitive, given the annual revenue of these vessels. Had 5B been implemented in 2001, operational costs for the catcher-processor fleet component might have increased due to the redeployment of fishing effort made necessary to make up a portion or all of the 17.6 percent of the status quo revenue at risk for this fleet component.

Catcher-processors operating in the EBS NPT flathead sole fishery would likely have increased operational costs under Alternative 5B due to increased running time to reach northern fishing areas when the more southerly areas are closed, and possibly due to increased fishing effort to mitigate the revenue at risk in these fisheries (Table 3.7-1). It is impossible to estimate the increase in operational costs without fully understanding the fishing effort redeployment strategy that the operators would follow in their attempt to mitigate these 5B attributable losses. Assuming 5B had been the rule in 2001, this would have meant that 11.8 to 29.3 percent of status quo revenue would have been placed at risk in the NPT fishery for flathead sole that year. Alternative 5B would require the use of bobbins and disks on NPT footropes and trawl sweeps used in open areas. The use of bobbins and disks may reduce the CPUE of some bottom-dwelling species such as flatfish, resulting in increased fishing time and associated operational costs to attain the status quo catch and revenue in these fisheries. This operational impact would occur primarily in the catcher-processor fleet component in the EBS.

In the AI, Alternative 5B would likely result in increased operational costs for both the catcher-vessel and catcher-processor fleets. Alternative 5B would require any vessel using NPT gear to have a VMS system. Although probably all of the vessels fishing the area currently have such a system, due to SSL regulations, Alternative 5B may require additional VMS operation time on these vessels. Alternative 5B also requires 100 percent observer coverage for vessels targeting groundfish, which would increase observer costs on the catcher vessels that are currently required to have only 30 percent observer coverage. Alternative 5B would produce a complicated patchwork of open and closed areas, depending upon coral/sponge bycatch rates that may change from year to year. This may require fishermen to alter their normal fishing areas and possibly explore for new fishing grounds on an annual basis. All of these fishing strategies would likely result in increased operational costs in the AI catcher vessel and catcher-processor NPT groundfish fleets (Table 3.7-1).

C.3.7.2.4 Safety Impact

Alternative 5B may not significantly affect the safety of any of the fleet components in the GOA, because fishing effort would likely be redeployed to immediately adjacent fishing areas (Table 3.7-1).

In the EBS, catcher-processors targeting flathead sole, other flatfish, and Pacific cod would be restricted from fishing some areas closer to their home ports, during some time periods, depending upon the fishing impact minimization measure area affected by the rotational closures to NPT gear. When more southerly areas are closed, vessels fishing NPT gear would be required to travel farther north and farther from safe harbor and ports of call.

Alternative 5B would likely affect the safety of the catcher-vessel and catcher-processor fleet components in the AI, because fishing effort would likely be redeployed to new fishing areas, possibly farther from the vessels' home ports.

C.3.7.2.5 Impacts on Related Fisheries

There would likely be an impact on related fisheries in the GOA from Alternative 5B, because a substantial amount of NPT fishing effort for slope rockfish would likely be redeployed into adjacent areas shallower than 200 m that would not be directly affected by the alternative. Other fisheries occur in these areas, including halibut longline, Pacific cod longline (when open), and other NPT fisheries such as shallow water flatfish. Increased NPT fishing effort at depths of less than 200 m along the GOA shelf edge may have negative (and potentially substantial) indirect economic impacts on these fisheries (Table 3.7-1).

There may be impacts on related fisheries from Alternative 5B in the EBS and AI, as vessels using NPT gear are displaced into adjacent areas where other gear groups such as HAL and POT vessels may be operating.

C.3.7.2.6 Costs to Consumers

There may be an increase in costs to consumers from Alternative 5B, because the total revenue at risk could not be recovered in the AI, due to the reduction in TACs (Table 3.7-1). There may be some increases in operational costs for certain fleet components that may be passed on to consumers from harvesters and processors (depending on market conditions, such as available close substitutes in supply, demand elasticities, vertical integration, etc.). There may also be attributable welfare costs imposed on consumers from changes in availability of supply, product mix, and/or product quality.

C.3.7.2.7 Management and Enforcement Costs

Management and enforcement costs may increase under Alternative 5B, although it is not possible to estimate by what numerical amount. Additional on-water enforcement may be required to assure compliance with the fishing impact minimization measures applied in the GOA, EBS, and AI (Table 3.7-1). Section 3.1.2.7 contains some additional discussion of the NOAA Enforcement and Coast Guard responses to resource demands connected with monitoring and enforcing provisions of Alternative 5B.

VMS equipment or 100 percent observer coverage might be needed on all vessels using NPT gear in the GOA and EBS, and both VMS and 100 percent observer coverage would be required in the AI to assure compliance with Alternative 5B. Most groundfish vessels operating in the GOA, EBS, and AI for pollock or Pacific cod fishery are already equipped with VMS. Vessels not equipped with VMS systems may be required to install and operate the VMS equipment during NPT fisheries in all areas. The number of additional vessels that would have to add VMS equipment under Alternative 5B is not known. Alternative 5B fishing impact minimization measures are specific to gear (NPT) and may require additional enforcement measures (boarding and inspection) beyond the typical time/area/fishery management measures currently employed in the GOA.

Alternative 5B specifically requires the development and implementation of a research and monitoring program to assess the effectiveness of the fishing impact minimization measures. Accomplishing these research and monitoring projects would require significant additional expenditures by the Alaska Region and Alaska Fisheries Science Center over a period of years.

C.3.7.3 Distributional Impacts

C.3.7.3.1 Gross Revenue at Risk Effects

C.3.7.3.1.1 Geographic Area Impacts

Alternative 5B, had it been the rule in 2001, would have imposed fishing impact minimization measures in the GOA, EBS, and AI. Within the GOA, the largest amount of revenue at risk would have been in the CG, with $2.55 million at risk, or 12.3 percent of the $20.69 million 2001 status quo revenue in the CG (Table 3.7-2). The revenue at risk in the WG totals $810,000, or 13.0 percent of the 2001 status quo revenue of $6.25 million. There would have been $240,000 revenue at risk in the EG, or 31.8 percent of the $760,000 status quo revenue that year.

In the EBS, Alternative 5B would have placed between $2.63 million and $5.61 million of revenue at risk, or 2.7 to 5.8 percent of the $96.27 million to $96.91 million of status quo revenue in the fisheries affected, had it been in place in 2001. However, the reduction in the combined BSAI trawl TAC for Pacific cod, required by Alternative 5B, would have reduced the revenue from NPT fisheries for Pacific cod in the EBS by $8.05 million, or more than the total of the combined species revenue at risk for EBS fishing impact minimization measures. These represent pure losses for the sector, because the forgone catch may not be made up by redeployment.

In the 2001 AI fisheries, $6.71 million in revenue would have been placed at risk, or 12.0 percent of the $55.81 million of status quo revenue in the affected fisheries. The TAC reductions required by Alternative 5B would have reduced the revenue in the AI NPT fisheries for Atka mackerel, Pacific cod, and rockfish by a total of $6.66 million, or nearly all of the revenue at risk in the AI in 2001 under Alternative 5B.

C.3.7.3.1.2 Fishery Impacts

In the GOA, Alternative 5B would affect a number of NPT fisheries, but primarily fisheries targeting rockfish and Pacific cod. The total revenue at risk, under these rules, in the NPT rockfish fishery would have equaled$2.82 million, or 30.1 percent of the status quo revenue of $9.36 million in 2001 (Table 3.7-2). The total revenue at risk in the GOA NPT Pacific cod fishery (mainly from the catcher-vessel fleet component) would have been $380,000, or 4.9 percent of the status quo revenue of $7.66 million.

Alternative 5B would place revenue s at risk in a number of NPT target fisheries in the EBS, including flathead sole, yellowfin sole, rock sole, other flatfish, and Pacific cod, among others. However, the largest revenue at risk would occur in the flathead sole fishery, where, had this rule been in place in 2001, $1.70 million to $4.23 million of revenue would have been at risk, equaling 11.8 to 29.3 percent of the $14.46 million status quo revenue, depending upon the rotational area affected. The total revenue at risk in the EBS NPT Pacific cod fishery would have ranged from $190,000 to $980,000, or 1.3 to 6.8 percent of the 2001 status quo revenue of $14.33 million. However, the reduction in the combined BSAI trawl TAC for Pacific cod, required by Alternative 5B, would have reduced the revenue from NPT fisheries for Pacific cod in the EBS by $8.05 million or, over $7.0 million more than the Pacific cod revenue at risk and more than the total of the combined species revenue at risk from EBS fishing impact minimization measures.

In the AI, Alternative 5B would place revenue at risk in NPT fisheries for Atka mackerel, flatfish, Pacific cod, and rockfish. The largest revenue at risk in the AI would be in the NPT Atka mackerel fishery, where, had 5B been in place in 2001, $3.61 million or 8.8 percent of the status quo revenue of $41.01 million would have been placed at risk. The TAC reduction requirement under Alternative 5B, would have reduced the trawl-caught Atka mackerel revenue in the AI by $2.73 million or 75.6 percent of the revenue at risk in this 2001 fishery, leaving $880,000 of revenue at risk that could potentially have been recovered, in whole or in part, with redeployment of fishing effort. In addition to the impacts on the Atka mackerel fishery, Alternative 5B would have placed $1.64 million of Pacific cod at risk, or 17.1 percent of the status quo revenue of $9.61 million, in this 2001 fishery. However, the TAC reduction in AI trawl-caught Pacific cod would have reduced the revenue in this fishery by $2.83 million, or more than the revenue at risk that was estimated based on 2001 harvest data. Under Alternative 5B, $1.45 million of revenue would have been placed at risk in the NPT rockfish fishery, or 28.5 percent of the status quo revenue value of $5.08 million. Of this amount, $1.10 million would not have been recoverable, due to the TAC reduction. Some or all of the remaining $350,000 revenue at risk in the rockfish NPT fishery could potentially have been recovered by redeploying fishing effort to adjacent open areas or switching to PTR gear.

C.3.7.3.1.3 Fleet Component Impacts

In the GOA, had this rule prevailed in 2001, the catcher-processor fleet would have had the greatest amount of revenue at risk, $2.70 million, or 17.6 percent of the status quo total revenue. The catcher-vessel fleet would have had $900,000 of ex-vessel revenue at risk, or 7.3 percent of the total ex-vessel revenue of $12.31 million (Table 3.7-2). Under Alternative 5B, the catcher-vessel fleet would have had revenue at risk in the EG of $60,000, or 20.8 percent of status quo; in the CG, $470,000, or 4.9 percent of status quo; and in the WG, $360,000, or 16.0 percent of status quo. The GOA catcher-processor fleet would have had revenue at risk mainly in the CG ($2.07 million or 18.9 percent of status quo), but also in the WG ($450,000, or 11.3 percent of the $4 million status quo gross revenue) and the EG ($180,000, or 39.3 percent of the $450,000 status quo).

In the EBS, substantially all of the revenue at risk would have occurred in the catcher-processor fleet component. A total of $2.63 million to $5.61 million of revenue is at risk or 2.9 to 6.2 percent of $90.45 million to $91.08 million of status quo revenue, depending upon the rotational area closures, had 5B been in place that year. However, the reduction in the combined BSAI trawl TAC for Pacific cod, required by Alternative 5B, would have reduced the catcher-processor revenue from NPT fisheries for Pacific cod in the EBS by $8.05 million, or over $7.0 million more than the Pacific cod revenue at risk and more than the total of the catcher-processor combined species revenue at risk from EBS fishing impact minimization measures, based on the 2001 fisheries.

In the AI, the catcher-processor NPT fleet would have accounted for $6.40 million at risk under Alternative 5B, or more than 95 percent of the total 2001 revenue of $6.71 million. The catcher-processor revenue at risk of $6.40 million is 11.7 percent of the total 2001 status quo revenue of $54.49 million. The catcher-vessel fleets would have had $310,000 of revenue at risk, or 23.6 percent of the total status quo revenue of $1.32 million. All of the catcher-vessel fleet impact on revenue at risk in the AI is in the NPT fishery for Pacific cod, whereas the catcher-processor fleet impacts on revenue at risk are mainly in the Atka mackerel, rockfish, and Pacific cod fisheries. The TAC reductions, required by Alternative 5B, would have reduced the revenue in the catcher-processor fleet for Atka mackerel and rockfish and for the catcher-processor and catcher-vessel fleet for Pacific cod by a total of $6.66 million, or nearly all of the revenue at risk in the AI under Alternative 5B, had it been the rule in 2001.

C.3.7.3.2 Impacts on Dependent Communities

C.3.7.3.2.1 Overview

Like Alternative 5A, impacts to dependent communities may be significant at the community level, at least for a few communities (King Cove and Sand Point) under each of the Alternative 5B options. Adverse impacts to individual operations may occur in other communities (especially Kodiak), but these impacts are considered to be unlikely to be significant at the community level, due to magnitude of the impacts relative to the overall operations of the affected fleet and processing entities (as well as the overall community fishing sectors).

The only fisheries directly affected by any of the Alternative 5B options would be groundfish fisheries. Similar to Alternative 4 (but unlike Alternatives 2 and 3), groundfish fisheries in addition to rockfish would be affected by this alternative. Like Alternative 4, this alternative would have impacts on GOA, EBS, and AI fisheries. Like Alternatives 2, 3, and 4, the only gear group directly affected for both catcher vessels and catcher-processors would be non-pelagic trawl. Using 2001 fleet data, 93 vessels (catcher vessels plus catcher-processors) would be affected by this alternative: 28 in Alaska, 12 from Oregon, 47 from Washington, and 6 from other states. Washington and Oregon communities, though significantly engaged in the fishery, are not considered dependent communities, based on the overall economic structure of those communities and the relatively small role the Alaska groundfish fishery plays in the local economy. Using 2001 processor data, 19 shoreside processors in Alaska would potentially be affected by this alternative.

C.3.7.3.2.2 Catcher Vessels

Based on 2001 data (within Alaska), ownership of catcher vessels harvesting relevant groundfish species with at-risk revenue under any of the Alternative 5B options is concentrated in the AEB with 19 vessels (King Cove has 8 and Sand Point 11) and Kodiak with 7 vessels. All but two of the AEB vessels are classified as small (less than 60 feet) vessels, while none of the Kodiak vessels are so classified. Anchorage and Girdwood account for the remaining two Alaska-owned vessels; one of these is a small vessel, and one is a large vessel. Ownership in the Pacific Northwest accounts for 44 vessels with at-risk revenues under this alternative (32 from Washington, all but 2 of them large vessels, and 12 vessels, all large, from Oregon). Four vessels (three large and one small) are owned in other states.

Catcher vessel-associated community impacts in the GOA under any of the Alternative 5B options would be the same as those seen under Alternative 5A. As noted under that alternative, significant impacts associated with local catcher fleets could accrue to the communities of King Cove and Sand Point. Catcher vessel-associated community impacts in the EBS under any of the Alternative 5B options would be the same as those seen under Alternative 5A (not significant).

For catcher vessels operating in the AI, the only affected fishery would be Pacific cod under any of the options, but the amount of revenue at risk would vary by option. Under Option 1, the revenue at risk under this alternative ($310,000) is 23.6 percent of the status quo total ($1.32 million) for affected vessels for the area. As noted elsewhere, figures given for catcher vessels represent ex-vessel revenues, which would tend to understate the overall value to associated communities that derive benefits from both harvesting and processing activities if examined alone. Values for first wholesale revenues at risk by shoreside processors from landings of catcher vessels are referenced in the discussion of shoreside processor locations provided below. Based on known characteristics of the different fleet segments, the ownership of these vessels with at-risk AI revenues would primarily be concentrated in Pacific Northwest communities, and any impacts seen in Alaska would be concentrated in Kodiak. No significant community level impacts associated with this catcher fleet are anticipated, due to the amount of revenue at risk and the relative size and diversity of the economies of these communities (although some vessels would likely experience increased costs and/or decreased harvests).

Under Alternative 5B, Option 2, the revenue at risk ($50,000) is 3.9 percent of the status quo total ($1.32 million) of affected vessels for the AI area. The vessels with revenues at risk under Option 2 would be the same vessels as those with revenue at risk under Option 1; therefore, effects on communities would be expected to be similar to those seen under Option 1 (but of a lower intensity due to less revenue at risk). Impacts would be concentrated in Pacific Northwest communities and Kodiak, and no significant community level impacts are anticipated associated with this catcher fleet, due to the size and diversity of the economies of these communities and the relatively minor level of revenue at risk (although some vessels would likely experience increased costs and/or decreased harvests).

Under Alternative 5B, Option 3, the revenue at risk ($30,000) is 2.3 percent of the status quo total ($1.32 million) of affected vessels for the AI area. The vessels with revenues at risk under Option 3 would be the same vessels as those with revenue at risk under Option 1; therefore, effects on communities would be expected to be similar to those seen under Option 1 (but of a lower intensity due to less revenue at risk). Impacts would be concentrated in Pacific Northwest communities and Kodiak, and no significant community level impacts are anticipated associated with this catcher fleet, due to the size and diversity of the economies of these communities and the relatively minor level of revenue at risk (although some vessels would likely experience increased costs and/or decreased harvests).

C.3.7.3.2.3 Catcher-Processors

Based on 2001 data, Alaska ownership of catcher-processors with revenue at risk is exclusive to Kodiak (three vessels). Ownership in the Pacific Northwest is exclusive to Washington (15 vessels). Because of the small number of entities, information on harvest value cannot be disclosed for Alaska catcher-processors at risk under this alternative. For catcher-processors, impacts under any of the Alternative 5B options would be the same for the GOA as seen under Alternative 5A. Catcher-processor-related impacts under any of the Alternative 5B options in the EBS would also be the same as those seen under Alternative 5A.

For the AI, affected catcher-processors under Alternative 5B, Option 1, would experience revenue at risk of $6.40 million, or approximately 11.7 percent of the status quo revenue total ($54.49 million). (This is approximately 3.8 times the analogous revenue at risk under Alternative 5A.) Catcher-processors would experience revenue at risk associated with a number of different groundfish species. While some of these species have a relatively high percentage of revenue at risk, the overall value at risk is comparatively low for a number of these species. Only three species have revenue greater than $10,000 at risk. These are Atka mackerel ($3.61 million at risk, which is 8.8 percent of status quo value), Pacific cod ($1.33 million, 16.1 percent of status quo value), and rockfish ($1.45 million, 28.5 percent of status quo value). The catcher-processors harvesting and processing these species are primarily head and gut vessels.

Due to confidentiality restrictions based on a small number of participating entities, value information for Alaska-based catcher-processors with revenue at risk cannot be disclosed for this alternative. Impacts experienced in Alaska would, however, be concentrated in Kodiak. Given the small number of entities involved, and the relative size of the local fishery-based economy, it is assumed that community level impacts associated with catcher-processors would not be significant, although some individual entities may have experienced adverse impacts due to increased costs and/or decreased harvests. While individual Washington-owned entities may experience adverse impacts under Alternative 5B, Option 1, it is assumed that community level impacts would not be significant under this alternative due to the scale of the local economy in those communities.

Under Alternative 5B, Option 2, affected catcher-processors in the AI would experience revenue at risk of $2.94 million, or approximately 5.4 percent of the status quo revenue total ($54.49 million). Revenues at risk would be associated with the same groundfish species as under Option 1, but the amount of revenue at risk would be different for Atka mackerel, Greenland turbot, Pacific cod, and rockfish. Greenland turbot revenues at risk, however, as under Option 1, would be less than $10,000. For the other three species, revenue at risk would be less than that seen under Option 1: Atka mackerel ($1.59 million at risk, which is 3.9 percent of the status quo value), Pacific cod ($430,000 at risk, 5.2 percent of the status quo value), and rockfish ($1.19 million at risk, 23.5 percent of the status quo value). The vessels with revenues at risk under Option 2 would be the same vessels as those with revenue at risk under Option 1; therefore, effects on communities would be similar to those seen under Option 1 (but of a lower intensity due to less revenue at risk). Specific information on Alaska-based catcher processors cannot be disclosed, but impacts experienced in Alaska would be concentrated in Kodiak. Given the small number of entities involved, the small amount of revenue at risk, and the relative size of the local fishery-based economy, it is assumed that community level impacts associated with catcher-processors would not be significant, although some vessels may experience increased costs and/or decreased harvests. While individual Washington-owned entities may experience adverse impacts under this Alternative 5B option, it is assumed that community level impacts would not be significant due to the amount of revenue at risk and the scale of the local economy in those communities.

Under Alternative 5B, Option 3, affected catcher-processors in the AI would experience revenue at risk of $1.20 million, or approximately 2.2 percent of the status quo revenue total ($54.49 million). Revenues at risk would be associated the same groundfish species as under Option 1, but the amount of revenue at risk would be different for Atka mackerel, Greenland turbot, Pacific cod, and rockfish. Greenland turbot revenues at risk, however, as under Option 1, would be less than $10,000. For the other three species, revenue at risk would be less than that seen under Option 1: Atka mackerel ($620,000 at risk, which is 1.5 percent of the status quo value), Pacific cod ($320,000 at risk, 3.9 percent of the status quo value), and rockfish ($260,000 at risk, 5.1 percent of the status quo value). The vessels with revenues at risk under Option 2 would be the same vessels as those with revenue at risk under Option 1; therefore, effects on communities would have be similar to those seen under Option 1 (but of a lower intensity due to less revenue at risk). Specific information on Alaska-based catcher processors cannot be disclosed, but impacts experienced in Alaska would be concentrated in Kodiak. Given the small number of entities involved, the small amount of revenue at risk, and the relative size of the local fishery-based economy, it is assumed that community level impacts associated with catcher-processors would not have been significant, although some vessels may experience increased costs and/or decreased harvests. While individual Washington-owned entities may experience adverse impacts under this Alternative 5B option, it is assumed that community level impacts would not be significant, due to the amount of revenue at risk and the scale of the local economy in those communities.

C.3.7.3.2.4 Shoreside Processors

Shoreside processors involved in the at-risk harvest (using 2001 data) under any of the Alternative 5B options are concentrated in Kodiak (with nine entities). Akutan had two entities, and a number of other communities each had a single processor that processed at least some groundfish from vessels with at-risk revenues under this alternative (King Cove, Sand Point, Unalaska/Dutch Harbor, Ketchikan, Moser Bay [Kodiak Island Borough], Chignik, Sitka, and Cordova).

Under Alternative 5B, Option 1, the total first wholesale value at risk of catch delivered inshore for processing represents approximately 8 percent of the total status quo value (about $3.28 million out of $42.45 million) of the relevant fisheries of the GOA area, about 24 percent of the AI status quo value (about $726,000 out of $3.08 million), well below 1 percent for the EBS area, and about 7 percent for all areas combined (about $4.01 million out of $58.84 million), but no breakdown by port of landing is available. Caution must be exercised in the interpretation of these wholesale value data as (1) they are not additive with ex-vessel values presented above, and (2) they cannot be used as a proxy for potential levels of impacts to specific communities without considering the basic caveats laid out in the introductory paragraphs of Section C.3.3.3.2.4 of the Alternative 2 discussion. Similar to Alternative 5A, processor-associated impacts to dependent communities may be significant in some of the smaller communities in the WG area (for the reasons discussed under Alternative 5A), but data that would be needed to quantify these impacts are confidential. Based on 2001 processor location data, it is assumed that most of the additional AI Pacific cod catch at-risk under this alternative (compared to Alternative 5A) would be processed in Unalaska/Dutch Harbor. In terms of the scale of potential impacts, the $310,000 at risk (using 2001 data) is equivalent to 2 percent of the total Pacific cod value ($15 million) processed in the community in 2000, or about 0.2 percent of the total value ($144 million) for all species processed in the community in 2000, the most recent year for which complete community level data are available. Given that at least some of this catch would likely be made up by redeployment of catcher vessel effort in other areas, along with the low overall proportion of the at-risk totals compared to overall local processing, no significant community impacts associated with processing are likely for Unalaska/Dutch Harbor, although some individual entities may experience a loss of processing volume and/or revenues. No significant community impacts are anticipated for any other dependent communities.

Under Alternative 5B, Option 2, revenue at risk for the relevant fisheries of the GOA area and the EBS area would be the same as under Option 1. For the AI fisheries, revenue at risk for all fished species would remain the same for relevant fisheries with one exception: Pacific cod deliveries to shoreline processors would have less revenue at risk under Alternative 5B, Option 2, than under Option 1. It is assumed that most of AI Pacific cod catch at-risk under this option would be processed in Unalaska/Dutch Harbor. The $50,000 at risk is approximately 0.3 percent of the total Pacific cod value ($15 million) processed in the community in 2000 (the most recent year for which complete community-level data for Unalaska/Dutch Harbor are available), or about 0.03 percent of the total processing value ($144 million) for the community in 2000. Given the low overall proportion of the at-risk totals compared to overall local processing, no significant community impacts associated with processing would be likely for Unalaska/Dutch Harbor, although some individual entities may experience a loss of processing volume and/or revenues. No significant community impacts would be likely for any other dependent communities.

Under Alternative 5B, Option 3, revenue at risk for the relevant fisheries of the GOA area and the EBS area would be the same as under Option 1. For the AI fisheries, revenue at risk for all fished species would remain the same for relevant fisheries with one exception: Pacific cod deliveries to shoreline processors would have less revenue at risk under Alternative 5B, Option 3, than under Option 1. It is assumed that most of AI Pacific cod catch at-risk under this option would be processed in Unalaska/Dutch Harbor. The $30,000 at risk is approximately 0.2 percent of the total Pacific cod value ($15 million) processed in the community in 2000 (the most recent year for which complete community-level data for Unalaska/Dutch Harbor are available), or about 0.02 percent of the total processing value ($144 million) for the community in 2000. Given the low overall proportion of the at-risk totals compared to overall local processing, no significant community impacts associated with processing would be likely for Unalaska/Dutch Harbor, although some individual entities may experience a loss of processing volume and/or revenues. No significant community impacts would be likely for any other dependent communities.

C.3.7.3.2.5 Multi-Sector Impacts

Multiple sector impacts may be significant at the community level under Alternative 5B, Option 1. Among Alaska communities, Kodiak, King Cove, and Sand Point participate in more that one sector with at-risk revenues. Kodiak is home to seven locally owned catcher vessels, three locally owned catcher-processors, and some nine locally operating shoreside processing entities with at least some revenue at risk, depending on closure configurations. Neither King Cove nor Sand Point is home to locally owned catcher-processors, but both have multiple locally owned catcher vessels (8 and 11 vessels, respectively) and have at least one dominant local processor with at least some revenue at risk under this alternative. Alaska fleet related community impacts would be similar to those seen under Alternative 5A, with revenue at risk for King Cove and Sand Point catcher vessels comprising a higher percentage of total overall ex-vessel revenues than is the case in Kodiak, and these vessels represent a much larger proportion of the total community fleet in King Cove and Sand Point than do the affected vessels in Kodiak. Given the smaller vessels in King Cove and Sand Point (with less flexibility of response), the higher proportion of revenue at risk, the higher proportion of the fleet with revenue at risk, and the known challenges that these fleets (and communities) are facing with other fisheries, the WG communities of King Cove and Sand Point may experience social impacts from this alternative that would be significant at the community level. Other Aleutians East Borough communities that derive benefits from revenues generated through borough raw fish taxes on landings in King Cove and Sand Point may have experienced impacts. These impacts to other borough communities would, however, probably not have been significant as the overall quota would have been unchanged, and no changes would have been expected in landing patterns at the regional level. Individual Kodiak entities may experience adverse impacts under this alternative, but impacts at the community level are considered unlikely to rise to the level of significance given the small proportion of revenue at risk for the affected catcher vessels, the low volumes at risk, and the assumption that overall delivery patterns are unlikely to change for Kodiak based shoreside processors under this alternative. Kodiak may experience additional catcher-processor related impacts over and above those seen in Alternative 5A, but the information that would permit such an analysis is confidential. Some additional Alaska resident crew positions on vessels owned elsewhere, but that spend at least part of the year in Alaska ports, may have some compensation at risk. Transient vessels owned outside of Alaska typically also make expenditures in ports of landing, which, in this case, would be concentrated in Kodiak. Given the assumption that overall delivery patterns for the community are unlikely to change, however, any vessel expenditure associated impacts are likely to be minor.

Multiple sector community impacts under Alternative 5B, Option 2, would be the same as those identified under Alternative 5B, Option 1, because the same fleets and processors would be affected, and most multiple sector impacts to communities would be driven largely by GOA impacts that would not differ between the options under this alternative. As under Alternative 5B, Option 1, these impacts may be significant at the community level in King Cove and/or Sand Point for the reasons identified in the Alternative 5B, Option 1, discussion. Additional impacts would be concentrated in Kodiak, but it is not likely that they would be significant at the community level for the reasons outlined in the Alternative 5B, Option 1, discussion.

Multiple sector community impacts under Alternative 5B, Option 3, would also be the same as those identified under Alternative 5B, Option 1, because the same fleets and processors would be affected, and most multiple sector impacts to communities would be driven largely by GOA impacts that would not differ between the options under this alternative. As under Alternative 5B, Option 1, these impacts may be significant at the community level in King Cove and/or Sand Point for the reasons identified in the Alternative 5B, Option 1, discussion. Additional impacts would be concentrated in Kodiak but it is not likely that they would be significant at the community level for the reasons outlined in the Alternative 5B, Option 1, discussion.

The potential for cumulative impacts is less straightforward. Even if the potential for social impacts under Alternative 5B would not be significant in isolation, this alternative would have the potential, nonetheless, to impose adverse cumulative impacts when evaluated in the context of other factors that are currently affecting North Pacific and EBS fisheries and fishing communities. Cumulative effects could include interactions with the social impacts of, among others, the near-shore closures put in place in 2001 to protect Steller sea lions, proposed rationalization of the BSAI crab and GOA groundfish fisheries, and the severe decline in salmon prices. These effects would likely be concentrated in communities with (relatively) significant dependence on small boat fleets and communities that are dependent on both salmon harvesting and one or more of the fisheries that would be affected by the alternative.

C.3.8 Alternative 6

Alternative 6 proposes to amend the GOA and BSAI Groundfish FMPs, the Alaska Scallop FMP, the BSAI Crab FMP, and Pacific Halibut Act regulations to prohibit the use of all bottom tending gear (dredges, bottom trawls, pelagic trawls that contact the bottom, longlines, dinglebars, and pots) within approximately 20 percent of the fishable waters (i.e., 20 percent of the waters shallower than 1,000 m) in the BSAI and GOA.

C.3.8.1 Benefits Associated with Alternative 6

C.3.8.1.1 Passive-use Benefits

Under Alternative 6, all bottom-contact fishing activities targeting all FMP managed species would be prohibited from 20 percent of the fishing grounds (areas shallower than 1,000 m) in the GOA, EBS, and AI. While it is currently impossible to provide an empirical estimate of the passive-use value attributable to this protection of EFH, it is assumed that Alternative 6 would yield some incremental increase in the passive-use benefit of EFH over the status quo, Alternative 1 (Table 3.8-1). Alternative 6 would reduce the impact of bottom-contact fishing over 61,991 sq. km of GOA (17.4 percent of the current 356,199 sq. km of habitat), 136,031 sq. km of EBS habitat (17.0 percent of the current 798,870 sq. km of habitat), and 20,729 sq. km of AI habitat (19.7 percent of the current 105,243 sq. km of habitat), for a total of 218,750 sq. km, or 17.4 percent of the total fishable area of 1,260,312 sq. km in the GOA, EBS, and AI (Table 1.4-1). See EIS Sections 2.3.3 and 4.3 for details on the fishing impact minimization measures and the environmental consequences of Alternative 6.

C.3.8.1.2 Use and Productivity Benefits

Alternative 6 is designed to reduce the effects of bottom contact fishing on EFH in the GOA, EBS, and AI beyond measures currently in place or planned as part of other fishery management actions. Current scientific knowledge does not permit either a quantitative or qualitative assessment of the use benefits derived from minimizing the effects of fishing on EFH. However, the assumption implicit in the amendment to the Magnuson-Stevens Act requirement to minimize effects of fishing on EFH is that doing so would result in the sustained or enhanced production from FMP species and contribute to a healthy ecosystem (Table 3.8-1). As such, Alternative 6 would contribute additional measures that would further reduce the impacts of fishing on EFH.

C.3.8.2 Costs Associated with Alternative 6

C.3.8.2.1 Industry Revenue at Risk

Assuming, for purposes of this analysis, that Alternative 6 had been in place in the 2001 fishing year, it would have placed $237.2 million of commercial fishing gross revenue at risk, or 18.9 percent of the total $1.26 billion status quo gross revenue, in that year (Table 3.8-1). It is unlikely that all of this revenue at risk could have been recovered by redeploying bottom-contact fishing effort from closed areas into open areas under the fishing impact minimization measures imposed by Alternative 6. Without a thorough understanding of the fishing effort redeployment strategy that would be followed by fishermen in each fishery, and of the impact of effort redeployment among fisheries, it is impossible to accurately predict the amount of revenue at risk that might be recovered.

Alternative 6 could have significant adverse impacts on particular fisheries, due to their location and their operational limitations. For example, Alternative 6 would likely eliminate the small catcher vessel halibut longline fishery in St. George. These vessels have very limited operational range. The substantial area closed to longline fishing (indeed, all bottom contacting gear) around St. George Island, by Alternative 6, could effectively preclude redeployment of fishing effort to remaining open fishing grounds, all of which lie beyond this fleet's safe operating range.

Similarly, Alternative 6 would close significant portions of the GOA and AI scallop fishing grounds. Scallop dredging is conducted I on known beds that are limited in number. ADF&G sets annual guideline harvest ranges (GHRs) for each management district based on the production potential from the scallop beds in each district. Loss of catch and revenue in one district cannot be recovered by transferring GHR to another district, because each district is managed for its maximum sustained production. It is unlikely that fishermen would find new scallop beds in open areas. Therefore, scallop dredge revenue, projected to be at risk under Alternative 6, would more than likely be lost. Similar revenue at risk losses may occur in regional groundfish and crab fisheries in each area.

C.3.8.2.2 Product Quality and Revenue Impacts

Revenue impacts from changes in product quality would be likely under Alternative 6 for the catcher-vessel fleet. The catch and revenue at risk under Alternative 6 would be relatively large for the catcher-vessel fleet component and would likely result in longer fishing trips and extended running time for catcher vessels fishing in open areas. The increased running time, especially in more exposed and extreme sea and weather conditions, is inversely correlated with the quality of groundfish and halibut catch delivered for inshore processing. These conditions are also associated with increased deadloss in crab fisheries.

Product quality might not be affected to an equivalent degree in the catcher-processor fleet component, since these vessels process the catch onboard the vessel. However, the catcher-processor fleet would still be adversely affected if the average size of the fish or their condition were significantly different in the remaining open areas than would have been expected in the closed areas. For a number of economically important species (e.g., pollock, Pacific cod), the size of the fish is highly correlated with its use in the production of specific products. As the fish get smaller, on average, the product forms that can be produced and successfully marketed become fewer. Production that would have supplied a relatively high-value market (e.g., deepskin fillets) might have to be diverted to lower-value product forms, with accompanying adverse effects on net revenues per unit output, and perhaps even downstream impacts on quality, product mix, supplies, and prices to consumers.

C.3.8.2.3 Operating Cost Impacts

Alternative 6 would likely have significant adverse impacts on the operational costs of most, if not all, of the bottom contact gear groups. Elimination of 20 percent of the fishing grounds in each region would require additional running time to reach open areas and return to port to deliver catch (or product). It is likely to result in fishing in areas with lower CPUE, requiring increased fishing effort to recover catch and revenue at risk. Additionally, it could require costly exploration of unfamiliar fishing grounds, with associated gear damage and loss, and could aggravate gear conflicts that also cause expensive gear loss or damage. Fishermen may attempt to mitigate the loss of revenue at risk in bottom contact fisheries by converting to pelagic gear, when possible, requiring substantial investments in vessel modifications and/or new fishing gear. There may also be additional costs resulting from learning to fish new gear in new areas. This option would not be available to many of the potentially affected operations, because

PTR is not a legal gear type for species such as Pacific halibut or any or the crab species. Nor is it an effective means of harvesting many other species for which the target fisheries would be restricted under Alternative 6 (e.g., flatfishes).

C.3.8.2.4 Safety Impact

Adoption of Alternative 6 is likely to adversely affect safety in many of the affected fleet components and fisheries. Large area closures to all bottom-contact gear could result in vessels traveling farther from their homeports and shoreside delivery locations, increasing the length of fishing trips. Fishing in remote areas could impose additional risks of weather-induced safety impacts and increase the time required to run to safe harbor, as well as for response to emergencies. Closures of traditional, local fishing areas may induce fishermen to take additional risks, run the extra miles of open seas, or fish in weather and sea conditions that they would normally avoid, in order to remain economically viable in the fishery. All of these responses to the Alternative 6 closures would place greater strain on vessels and crew, reducing safety margins for the industry.

C.3.8.2.5 Impacts on Related Fisheries

Alternative 6 would be expected to adversely affect related fisheries by concentrating fishing effort. Under Alternative 6, all bottom-contacting fishery gear types would be confined to the remaining fishing grounds that would be unrestricted by fishing impact minimization measures or other management closures. Significantly reducing the area available for bottom-contact fishing could result in incompatible gears attempting to fish the same area at the same time. These gear conflicts can result in loss of catch, ghost fishing by derelict gear (with undesirable ecological impacts), and higher costs for everyone fishing the grounds, even those not directly regulated by the provisions of Alternative 6. In extreme cases, these conflicts can cause considerable damage and can even place vessels and crew at risk.

C.3.8.2.6 Costs to Consumers

There would very likely be an increase in costs and a reduction in welfare to consumers from Alternative 6, because the total catch (and thus, revenue) at risk would almost certainly not be recovered in all areas and for all species (Table 3.8-1). Reducing the supply and product mix produced by these fisheries would be expected to adversely affect both domestic and international markets. This would likely mean shorter supplies at the retail level, a reduced variety of seafood and associated fish products, perhaps lower quality, and higher prices to consumers. These welfare losses, while not amenable to quantification at this time, would nonetheless represent a real cost attributable to Alternative 6. In accordance with OMB guidance, only consumer welfare losses accruing to United States consumers are appropriately included in these benefit/cost calculations. While a significant share of output of these fisheries enters the international marketplace, a substantial portion of the production would be destined for United States domestic consumption.

A decline in the seafood supply from the U.S. EEZ off Alaska may force consumers to use more foreign products as replacements. Potential negative effects include the following:

1. A loss of market share will result in American producers losing revenue, which may be a difficult trend to reverse.
2. Reduction in seafood and associated fish products exported from the EBS, GOA, and AI to Asia and other world markets would negatively impact the U.S. trade balance.

3. Imports into U.S. markets would increase to meet American consumer demand, increasing the U.S. trade deficit.
4. The U.S. tends to incorporate more rigorous environmental standards in its fishery management as compared to some other nations, so increasing consumption of seafood from some foreign suppliers may lead to indirect environmental impacts elsewhere in the world.

C.3.8.2.7 Management and Enforcement Costs

Management and enforcement costs would likely increase under Alternative 6, although it is not possible to estimate by what amount. Additional on-water enforcement may be required to assure compliance with the fishing impact minimization measures applied in the GOA, EBS, and AI (Table 3.8-1). Section 3.1.2.7 contains some additional discussion of the NOAA Enforcement and Coast Guard responses to resource demands connected with monitoring and enforcing provisions of Alternative 6.

VMS equipment or 100 percent observer coverage could be required of all vessels using bottom contact fishing gear in each area. Most groundfish vessels operating in the GOA, EBS, and AI pollock or Pacific cod fishery are already equipped with VMS. Vessels employing bottom contacting gear but not currently equipped with VMS equipment could be required to install and operate the VMS equipment while fishing in all regulated areas. Crab, halibut, scallop, and groundfish vessels using pot and jig gear typically do not have VMS. The number of additional vessels that would be required to install and operate VMS under Alternative 6 is not known. Alternative 6 fishing impact minimization measures apply to all bottom-contact gear and are likely to require additional enforcement measures (boarding and inspection) beyond the typical time/area/fishery management measures currently employed.

Although only Alternative 5B specifically requires the development and implementation of a research and monitoring program, it is likely that some form of research and monitoring program may be necessary under Alternative 6 to measure the effectiveness of the Alternative. Accomplishing these research and monitoring projects would require significant additional expenditures by the Alaska Region and Alaska Fisheries Science Center over a period of years.

C.3.8.3 Distributional Impacts

C.3.8.3.1 Gross Revenue at Risk Effects

C.3.8.3.1.1 Geographic Area Impacts

Alternative 6 would impose fishing impact minimization measures in all FMP areas. Had this rule prevailed in 2001, a total of $237.20 million (8.9 percent) of the total status quo revenue of $1.26 billion would have been placed at risk under the fishing impact minimization measures imposed by Alternative 6. Revenue at risk and status quo revenue include the ex-vessel value of landings in the crab, scallop, halibut, and catcher vessel groundfish fisheries and first wholesale value in the catcher-processor groundfish fisheries.

The largest revenue at risk would have occurred in the EBS, with $177.54 million (19.0 percent) of the $934.36 million at risk, in 2001. The GOA would have had revenue of $46.52 million at risk, or 22.0 percent of the 2001 status quo revenue of $211.48 million. The AI would have had $13.14 million at risk, or 11.8 percent of the 2001 total revenue of $111.30 million.

Within the GOA, the CG would have incurred the greatest revenue at risk under Alternative 6, with $29.23 million at risk, or 27.6 percent of the 2001 status quo revenue of $105.92 million. The WG would have had $9.73 million at risk, or 29.2 percent of the $33.20 million total status quo revenue. The EG would have had $7.56 million at risk, or 10.5 percent of the $72.26 million of status quo revenue.

C.3.8.3.1.2 Fishery Impacts

Assuming for sake of argument that the 2001 fisheries had been managed under the provisions of Alternative 6, this rule would have placed $163.76 million of groundfish revenue at risk, or 16.0 percent of the overall Alaska status quo revenue of $1.03 billion (Table 3.8-2). The halibut fishery would have had $38.34 million at risk, or 34.2 percent of the 2001 status quo revenue of $112.16 million. Crab fisheries would have had $34.11 million at risk, or 29.4 percent of the total status quo revenue of $116.0 million. Alternative 6 would have placed $980,000 in revenue at risk in the scallop dredge fishery, or 29.1 percent of the total status quo revenue of $3.37 million.

Alternative 6 would not directly affect salmon fisheries, although indirect impacts may accrue, due to diversified salmon operations being adversely affected in their crab, halibut, or groundfish fishing activities.

Alternative 6 would affect nearly all bottom contact fisheries in each area. In the GOA, Alternative 6 would have the largest effect on the halibut HAL fishery, with $32.12 million in revenue at risk, or 33.9 percent of the 2001 status quo revenue of $94.62 million, had the fishery been governed under this alternative. Sablefish HAL and NPT fisheries would have had $6.66 million in revenue at risk, or 12.5 percent of the status quo revenue of $53.21 million. Rockfish HAL and NPT fisheries would have had $2.29 million of revenue at risk, or 21.5 percent of the status quo revenue of $10.67 million. There would have been $2.63 million of revenue placed at risk in the GOA HAL and NPT Pacific cod fisheries, or 11.7 percent of the 2001 status quo revenue of $22.43 million. Alternative 6 would have placed $940,000 in revenue at risk, or 34.3 percent of the $2.74 million of status quo revenue in the GOA scallop dredge fishery, had it been in place in 2001. The GOA scallop revenue at risk almost certainly could not have been recovered by redeploying fishing effort to remaining open areas, because the GHR is not transferable between districts.

In the EBS, Alternative 6 would have had the largest effect on the pollock PTR fishery, with $104.04 million, or 16.8 percent of the total status quo revenue of $618.60 million placed at risk. Alternative 6 would have placed $28.45 million in revenue at risk, or 35.3 percent of the $80.70 million of status quo revenue in the EBS crab POT fisheries. The Pacific cod HAL and NPT fisheries would have had $23.83 million of revenue at risk, or 17.2 percent of the $138.80 million in 2001 status quo revenue. Alternative 6 would have placed$10.65 million of revenue at risk in the yellowfin sole NPT fishery, or 30.1 percent of the status quo revenue of $35.39 million in this fishery. The halibut HAL fishery would have had $3.53 million of revenue at risk, or 36.0 percent of the total status quo revenue of $9.80 million, in 2001.

In the AI, Alternative 6 would have the largest effect on crab POT fisheries, with $5.30 million in revenue at risk, or 26.5 percent of the status quo revenue, had it been the rule in 2001. The AI HAL halibut fishery would have had $2.69 million at risk, or 34.7 percent of the $7.74 million of status quo revenue. The Pacific cod HAL and NPT fisheries would have had $2.32 million at risk under Alternative 6, or 7.4 percent of the $31.35 million status quo revenue. Atka mackerel NPT, flatfish NPT, and sablefish HAL and NPT fisheries would also have had revenue placed at risk in the AI under Alternative 6 (Table 3.8-2).

C.3.8.3.1.3 Fleet Component Impacts

If in place in 2001, Alternative 6 would have placed $86.30 million in revenue at risk for the catcher-vessel fleet component, or 21.6 percent of the total status quo revenue of $398.67 million in this fleet component (Table 3.8-2). The catcher-vessel fleet component would have had the most revenue at risk in the halibut fishery at $38.28 million, or 34.2 percent of total status quo revenue. Other impacts to the catcher-vessel fleet would have included the revenue placed at risk in the crab industry ($31.26 million, or 29.5 percent of status quo revenue) and the groundfish fisheries ($16.76 million, or 9.3 percent of status quo revenue). The largest impacts in the catcher-vessel fleet would have occurred in the GOA HAL and NPT fisheries, as well as in the EBS and AI HAL and POT fisheries.

For the catcher-processor fleet component, Alternative 6 would have placed $150.89 million at risk, or 17.6 percent of the $858.47 million 2001 status quo revenue. Catcher-processors harvesting groundfish would have had $147 million in revenue at risk, or 17.4 percent of the $845.01 million status quo revenue in these fisheries. Catcher-processors operating in crab fisheries would have had $2.85 million in revenue at risk, or 28.6 percent of the status quo revenue in 2001. Catcher-processors operating in the scallop dredge fishery would have had $980,000 in revenue at risk, or 29.1 percent of the status quo revenue of $3.37 million. Alternative 6 would primarily affect catcher-processors using HAL and NPT in the GOA; catcher-processors using PTR, NPT, HAL, and POT in the EBS; and catcher-processors using NPT, POT, and HAL in the AI (Table 3.8-2).

C.3.8.3.2 Impacts on Dependent Communities

C.3.8.3.2.1 Overview

Alternative 6 is very different from the other alternatives in terms of potential impacts on dependent communities. Unlike the other alternatives, Alternative 6 would have a direct impact on gear types other than nonpelagic trawl gear and on fisheries other than groundfish. In addition to those involved in the groundfish fishery, communities engaged in or dependent upon the crab, scallop, and halibut fisheries could also experience adverse impacts. Alternative 6 would result in impacts to vessels using hook and line, jig, nonpelagic trawl, pelagic trawl, and pot gear in the groundfish fisheries, as well as pot gear in the crab fisheries, dredge gear in the scallop fisheries, and hook and line gear in the halibut fisheries.[8] This alternative also has a large geographic footprint, and potential impacts could be realized in communities with links to a range of fisheries in the GOA, EBS, and AI areas.

In the following subsections, impacts to catcher vessels, catcher-processors, and shore-based processors are presented, along with the links of these sectors to dependent communities that would realize impacts. In addition to these more or less straightforward impacts, Alternative 6 would also have a different order of magnitude of impacts in some communities, based on interactive impacts.

Unlike the other alternatives, Alternative 6 features large closure areas close by (or immediately adjacent to) a number of communities. Thus, in addition to having impacts to a broad range of fishery participants utilizing wide-ranging fleets, it could result in profound localized impacts for a number of communities with small boat-based fleets through the closure of a significant portion of (or even all) waters within the operational range of small vessels. One example of this would be St. George in the EBS, where over 97 percent of waters within 20 miles of the community would effectively be closed to halibut fishing,

[8] At its April 2003 meeting, the Council clarified that subsistence and recreational fisheries would not be included in Alternative 6; therefore, the discussion in this section assumes that the only potential impacts to these fisheries would be indirect (and would result from direct impacts to commercial fishing).

which at present is the only commercial fishery pursued by the local resident fleet. This enterprise has received considerable investment of time, effort, and resources, not only by local residents, but by the local CDQ group (Aleutian Pribilof Islands Community Development Association). An attempt to foster a more viable fisheries base for the local economy has not recovered from earlier federal withdrawal from the community. In other communities, local small boat fleets engage in a range of other fisheries that could not be pursued within EFH closure areas under this alternative.

In addition to impacts on communities already engaged in or dependent upon a range of fisheries, this alternative would also make it more difficult, if not impossible, for a number of other communities to develop small boat-based commercial fisheries in the future. Perhaps the most extreme example of this would be Nelson Lagoon in the AEB. While not a major participant in halibut fisheries at present, virtually all waters within 20 miles of the community would be closed to bottom gear, meaning future development of a small boat fishery would effectively be precluded as long as the closure remains in effect. Of course, EFH area closures would be only one of the factors that could impede such development. The fact that halibut fishing is now governed by an IFQ system that restricts entry would be another significant barrier.

The type of localized impacts associated with Alternative 6 would also have interactive effects when applied in conjunction with existing management measures and ongoing dynamics. This type of interaction would, of course, occur under all of the alternatives, but is expected to be most profound in terms of community impacts for Alternative 6. A primary example of this would be the cumulative impact of Alternative 6 closures near communities, combined with Steller sea lion protection measure closures recently put in place near a number of those same communities. Both serve to effectively limit the areas available to small boat fleets.

Another source of interactive or cumulative impacts for a number of communities (and not just those with small vessel fleets immediately at risk under this alternative) would be seen in the fishery management measures not yet in place, but under active consideration for implementation in the immediate or foreseeable future. These include BSAI crab and GOA groundfish fisheries rationalization. Of the two, the BSAI crab rationalization initiative is further along in the alternative development process. It is clear that, depending on the alternative ultimately selected for implementation, at least some of the communities that would experience adverse impacts under Alternative 6 could also experience profound adverse impacts under BSAI crab rationalization. These communities would most obviously include St. Paul and St. George in the Pribilofs but would also include a number of other communities, such as those in the AEB, depending on the features of the particular rationalization approach taken.

Another type of interactive effect that would influence the magnitude of impacts felt under Alternative 6 would be the current dynamics seen in the crab and salmon fisheries. In the case of the crab fisheries, not only would Alternative 6 have direct adverse impacts on the crab fleets or processors in some communities through the closures themselves, but the decline of the crab fishery over the past several years has already resulted in adverse impacts to a number of those communities. Further, while Alternative 6 would not have any direct impact on salmon fisheries, the fact that salmon fisheries have been in a state of economic difficulty (to the point of some affected regions being formally declared economic disaster areas in recent years) means that, for a number of communities, the impacts of Alternative 6 would be magnified. An example of this type of vulnerability can be seen in the community of King Cove in the AEB.

Beyond impacts to communities directly engaged in the groundfish fisheries through the presence of local catcher vessels, catcher-processors, processors, or support service businesses, Alternative 6 also has the potential for generating adverse impacts in the CDQ region communities. These impacts could occur in a number of different forms, with impacts to royalties, vessels that have had CDQ investment, employment and income for fishery-related positions, and other CDQ investments such as infrastructure and fleet development in communities that could be adversely affected by area closures under this alternative. Examples of the latter impact would be investments by the Aleutian Pribilof Islands Community Development Association in the St. George halibut fleet and port development and analogous investments by the Central BS Fishermen's Association in St. Paul.

In the following sections, potential impacts to communities are discussed in terms of links to catcher vessels, catcher-processors, processors, and their respective activities. The likely impacts in any given community depend on the nature of engagement in the fisheries (and the relative level of dependence on the relevant fisheries), and this varies from community to community. Some communities have substantial engagement in the fishery through direct participation of a local catcher-vessel fleet, while engagement for other communities occurs primarily through local processing activity. Some communities are substantially engaged through both harvesting and processing. For others, local fishery support service businesses form a part of the economic foundation of the community. Additionally, a few communities participate through engagement with the catcher-processor sector.

Changes in each of these sectors have the potential for different types of community impacts. For example, local catcher-vessel fleets tend to provide employment and income to local residents. On the other hand, few long-term community residents may be involved in processing operations in a number of communities, but processing activity may underpin local economies through generation of municipal revenues. Both sectors may stimulate business for support service providers many different ways. In the following discussions, engagement by sector by fishery by community is provided, along with associated impacts to dependent communities. A treatment of multi-sector impacts and small boat fleet impacts from near-community closures follows the individual sector discussions.

C.3.8.3.2.2 Catcher Vessels

For catcher vessels, there is revenue at risk in the groundfish, crab, and halibut fisheries (but not the scallop fishery, as all participants in that fishery are classified as catcher-processors). In the groundfish fishery, for the affected catcher-vessel sector as a whole, at-risk revenue accounts for 9.3 percent of total relevant status quo revenue ($16.76 million at risk out of $180.60 million). Both halibut and crab fisheries have higher absolute and relative amounts of revenue at risk, notwithstanding that groundfish status quo revenues are higher than for either crab or halibut. As noted elsewhere, figures given for catcher vessels represent ex-vessel revenues, which would tend to understate the overall value to associated communities that derive benefits from both harvesting and processing activities if examined alone. Values for first wholesale revenues at risk by shoreside processors from landings of catcher vessels are referenced in the discussion of shoreside processor locations provided below. For halibut, 34.2 percent of the status quo revenues of all affected vessels is at risk ($38.34 million out of $112.16 million), with the analogous figure for affected crab catcher vessels being 29.5 percent ($31.25 million out of $106.03 million).[9]

[9] As a methodological note, fishery revenue totals in the different data sets used for different parts of the analysis in the EFH RIR and EIS are similar but not identical, due to different assumptions and derivations of the information. Further complications are introduced when revenues from a number of different fisheries with different records are distributed to communities, which requires a number of simplifying assumptions. The quantitative information presented in this section is most useful for relative comparisons and for understanding the direction and magnitude of change likely under this alternative, rather than for a precise quantification of the exact dollars involved.

Groundfish Catcher Vessels

The groundfish catcher vessels that would be affected by Alternative 6 are numerous and come from a wide range of communities, as shown in Table 3.8-3. A total of 507 catcher vessels harvested groundfish in 2001 in the areas affected by Alternative 6 (using gear that would not be allowed in these areas under this alternative). Of these vessels, 300 were owned by residents of 40 Alaska communities, and 13 of these communities had 5 or more vessels each. These are Kodiak (with 71 vessels), Sitka (40), Homer (36), Petersburg (28), Anchorage (14), Ketchikan (12), Sand Point (12), King Cove (10), Juneau (7), Cordova (6), Craig (6), Old Harbor (5), and Port Alexander (5). Additional communities with more than two affected vessels include Wrangell (four vessels), Anchor Point (three), Pelican (three), and Unalaska (three). Seven other Alaska communities have two vessels each, with the balance spread as one vessel each among fifteen communities.

Outside of Alaska, ownership of potentially affected groundfish vessels is concentrated in a number of Oregon and Washington communities. A total of 44 affected groundfish catcher vessels are owned by residents of 19 communities in Oregon. Newport dominates the Oregon portion of the fleet with 18 locally owned vessels. Only one other Oregon community (Woodburn) had three vessels, six communities had two vessels each, and the balance of the vessels were spread as 1 vessel each among the remaining ten communities. Washington residents own 146 vessels that would be affected by Alternative 6, of which 71 are from Seattle. Among other Washington communities, only three had five or more affected vessels (Anacortes with eight, Edmonds with seven, and Bellingham with five). Of the remaining communities, 1 had 4 vessels (Port Townsend), 2 had 3 vessels, 7 had 2 vessels, and the balance of the vessels were spread as 1 vessel each among the remaining 31 communities. Many of the Washington non-Seattle vessels are actually owned in communities within the greater Seattle area. A total of 17 affected vessels are owned outside of Alaska, Oregon, or Washington, with 6 in communities with 2 vessels each and the rest in 1-vessel communities.

Ownership patterns are much more complex for Alternative 6 than for any other alternative and vary by the individual groundfish fisheries that would be affected under this alternative. Of the 507 catcher vessels that would be affected overall, the breakdown is as follows: :

- Deepwater flatfish were harvested by 39 vessels – 44 percent from Oregon, and 26 percent each from Kodiak and Washington.
- Shallow water flatfish were taken by 99 of these catcher vessels – 54 percent from Washington, 26 percent from Oregon, 15 percent from Kodiak, and 5 percent from other places.
- Of the 447 other groundfish boats, 31 percent are from Washington, 9 percent from Oregon, 12 percent from Kodiak, 9 percent from Sitka, 7 percent from Homer, 6 percent from Petersburg, 24 percent from other places in Alaska, and 3 percent from other states.
- Pacific cod were taken by 366 of these vessels – 28 percent from Washington, 10 percent from Oregon, 18 percent from Kodiak, 9 percent from the AEB, 8 percent from Homer, 23 percent from other places in Alaska, and 4 percent from other states.
- Pollock were taken by 180 of these vessels – 41 percent from Alaska (14 percent from Kodiak, 8 percent from Homer, 6 percent from Sand Point, 3 percent from King Cove, and 10 percent from other Alaska communities), 16 percent from Oregon (more than half from Newport), 40 percent from Washington (at least 28 percent from the Seattle area), and 4 percent from other states.
- Rockfish were taken by 375 affected catcher vessels, with the shelf rockfish complex being harvested by 296 of these vessels. Of the 296 vessels, 38 percent were from Washington,11 percent from Oregon, 9 percent from Kodiak, 39 percent from other places in Alaska, and 3 percent from other states.

- Of the 290 catcher vessels that harvested sablefish, 33 percent were from Washington, 9 percent from Oregon, 11 percent from Kodiak, 44 percent from other places in Alaska, and 3 percent from other states.

Catch value figures cannot be disclosed for most communities with potentially affected vessels due to data confidentiality restrictions. Table 3.8-4 provides an aggregated distribution of affected groundfish catcher vessels by community grouping, and Table 3.8-5 provides ex-vessel value of harvest data for these same groupings. Value information is provided for pollock, Pacific cod, other groundfish, halibut, crab, and salmon fisheries for these vessels to allow for a consideration of the relative dependency of the groundfish fleet on the various major fisheries in which these vessels participate. As shown in the table, different area-owned fleets have very different relative levels of dependency on the different fisheries. For example, Kenai Peninsula Borough vessels are far more dependent on other groundfish compared to either pollock or Pacific cod, whereas the reverse is true for vessels from the AEB.

In terms of groundfish species harvested by catcher vessels in the GOA, six fisheries have an at-risk revenue of $10,000 or more. Three of these have relatively modest at-risk revenues: deep water flatfish ($60,000, or 18.1 percent of the status quo revenue of $320,000), shallow water flatfish ($40,000, or 2.2 percent of the status quo value of $1.60 million), and the residual category of other groundfish ($20,000, or 20.5 percent of the status quo figure of $90,000). Due to the low levels of revenue at risk, no catcher vessel-related dependent community impacts are anticipated for these fisheries. The species with more substantive values at risk are Pacific cod ($1.68 million at risk, or 10.9 percent of the status quo figure of $15.34 million), rockfish ($460,000, or 10.9 percent of the status quo figure of $4.25 million), and sablefish ($5.29 million, or 11.5 percent of the status quo value of $45.87 million). Given both more substantive values and the relatively high percentage of revenue at risk when compared to status quo values for these same vessels, there may be significant impacts to these vessels under this alternative. As noted above, ownership for vessels that harvested Pacific cod, rockfish, and sablefish is widely distributed within Alaska, with the result that a number of different communities would be affected. It is assumed that impacts within Alaska would be more concentrated in the communities of King Cove, Sand Point, Anchorage, Homer, and Kodiak than in other communities, based on the sheer number of affected vessels from those communities and the distribution of overall revenues. Each of these communities has at least 10 vessels that would be affected, and it is anticipated that, due to the size and diversity of the local economy, impacts would be less apparent at the community level in Anchorage than they might be in the other four communities.

No groundfish species in the AI have an at-risk value greater than $10,000. Due to the low amounts of groundfish revenue at risk, no community impacts related to AI groundfish fisheries catcher vessels are anticipated. For the EBS, only three species have an at-risk value greater than $10,000, and each of these species represents a relatively small percentage of relevant status quo revenue. These species are Pacific cod ($620,000, or 4.9 percent of the status quo figure of $12.66 million), pollock-midwater ($7.92 million, or 8.5 percent of the status quo figure of $93.44 million), and sablefish ($70,000, or 5.2 percent of the status quo value of $1.42 million). It is assumed that, because of the relatively small percentage of revenue at risk compared to total revenues for these vessels, the at-risk revenues could be recovered relatively easily through effort directed at remaining open areas for sablefish (especially given management under IFQ conditions) and Pacific cod (given a less than 5 percent at-risk figure). Pollock, with its larger at-risk percentage, may be more problematic. Given the distribution of the fleet, associated impacts to Alaska communities would likely be concentrated in Kodiak and Sand Point, in addition to the larger Pacific Northwest ports.

Halibut and Crab Catcher Vessels

Halibut Catcher Vessels

A total of 495 halibut vessels would have revenue at risk under Alternative 6. This includes 491 vessels that are listed in the database as halibut catcher vessels and 4 that are listed as catcher-processors. There is no distinct halibut catcher-processor fleet, as there are groundfish and crab; therefore, for this analysis, all halibut vessels are combined in the catcher vessel category.

A detailed distribution of halibut vessels by community of owner is shown in Table 3.8-6. Among halibut vessels with revenues at risk, 358 vessels (72.9 percent of the total fleet) are owned by residents of Alaska. Washington residents own 92 halibut vessels with at-risk revenues, while 31 are owned by Oregon residents, 6 by California residents, and 3 by residents of other states. Alaska halibut vessels with at-risk revenues are concentrated in Kodiak. With 90 vessels, Kodiak has more than twice as many vessels with revenues at risk than any other community. Marked concentrations are also found in Homer (44 vessels), Sitka (42 vessels), and Petersburg (38 vessels). Four other communities have more than 10 vessels with revenues at risk: Juneau (18), Ketchikan (14), Sand Point (13), and Anchorage (12). Six additional communities have five or more vessels with revenues at risk: Seward, St. George, and Port Alexander (each with eight), Craig and Cordova (seven each), and Anchor Point (five). Ten Alaska communities have two to four vessels each with revenues at risk, and an additional twenty-one communities have one vessel each with halibut revenues at risk.

Thirty-one halibut vessels with revenue at risk under Alternative 6 are owned by Oregon residents, and the pattern of community distribution of these vessels is very different than the pattern seen for either groundfish or crab vessels. Woodburn has more vessels (seven) than Newport (six), and only Warrenton (four) also has more than two vessels. Two other communities have two vessels each, and the remaining ten vessels are distributed among ten different communities. Among Washington communities only 4 have 5 or more vessels out of the 92-vessel fleet: Seattle (with 25 vessels), Anacortes (11), Port Townsend (7), and Edmonds (5), but as was the case with Newport, Seattle is not nearly as dominant relative to other in- state ports for halibut vessels as for groundfish vessels. One additional community has 4 vessels and another 3; the rest of the fleet is divided among 8 communities with 2 vessels each and 21 communities with a single vessel each.

As was the case with groundfish catcher vessels, because of low vessel counts, value information cannot be presented at the community level for many communities that are engaged in the halibut fishery through participation by locally owned vessels. Table 3.8-7 presents vessel count information for halibut vessels with at-risk revenue aggregated to regions, as well as the total revenues associated with these vessels. Within Alaska, the domination of Kodiak and the Kenai Peninsula Borough (primarily by Homer and Seward) in terms of at-risk revenues is clear, but other Alaska communities also contribute significantly in this regard. The greater Seattle area represents the greatest concentration of at-risk halibut revenue for the Pacific Northwest. The total halibut at-risk value is $38.28 million, of which 55 percent is taken by Alaska vessels, 32 percent by Washington vessels, and 8 percent by Oregon vessels. Alaska vessels tend to be smaller than Washington and Oregon boats, and their owners tend to own less quota share than Washington and Oregon owners.

For affected halibut vessels, 34.2 percent of the status quo revenue is at risk ($38.28 million out of $112.04 million). While percentages at risk are similar, the amount of revenue at risk varies considerably by region. Within the GOA, 33.9 percent of the halibut fleet's status quo revenue is at risk ($32.07 million out of $94.50 million). In the EBS, the percentage of revenue at risk is roughly comparable to what is seen in the GOA (36.0 percent), but the amount at risk is considerably lower ($3.53 million out of $9.80 million). In the AI, 34.7 percent of status quo halibut revenue of the affected vessels would be at risk ($2.69 million out of $7.74 million). Three hundred sixty of the four hundred ninety-five vessels in the affected halibut fleet for all areas also fish for groundfish in the areas to be closed by Alternative 6 and would have additional revenue at risk in those fisheries. The most important fisheries in this regard in the GOA are Pacific cod and rockfish, with deep and shallow flatfish being less significant. Sablefish is also an important fishery for many GOA and EBS halibut vessels in general.

There is considerable variation in halibut fleet composition among GOA, EBS, and AI areas in terms of patterns of community ownership, as well as the numbers of vessels involved. For the GOA taken as a whole, Alternative 6 would affect 336 halibut boats. This represents approximately 34 percent of the total GOA halibut fleet. Most vessels (232 vessels or 69 percent of the fleet) are from Alaska, predominantly from the communities of Kodiak (92), Homer (42), Sand Point (13), Petersburg (12), Anchorage (11), and Sitka (11). Together, these communities account for 78 percent of the affected Alaska fleet. Other Alaska communities with multiple halibut vessels with revenue that would be at risk in the GOA include Seward (eight vessels); Cordova (six vessels); Anchor Point (five vessels); King Cove and Wasilla (three vessels each); and Ketchikan, Port Lions, Seldovia, and Willow (two vessels each). An additional 18 communities ranging from Hoonah in Southeast Alaska to Unalaska/Dutch Harbor in the Aleutians have a single, locally owned halibut vessel with GOA revenues that would be at risk under this alternative. The Alaska vessels with at-risk halibut revenues in the GOA represent a mix of long-range vessels and vessels from small communities fishing relatively nearby waters.

The pattern of revenues that would be at risk under Alternative 6 varies somewhat from overall vessel ownership patterns. The CG represents 55 percent of the total value of the halibut fishery at risk under this alternative, while the WG represents an additional 18 percent of this at-risk fishery, and Southeast Alaska represents 9 percent. For the CG, Alaska boats represent 61 percent of the value of the regional at-risk halibut fishery, with more than half of this attributable to Kodiak (33 percent of the total), followed by Homer, Seward, and Petersburg. Much of this is a resident fleet. Washington vessels represent 25 percent of the central GOA at-risk halibut value, mainly from Seattle. Oregon vessels represent 11 percent of this value, with some concentration of vessels in Newport. The smaller WG at-risk halibut revenue is mainly taken by Washington boats (55 percent) concentrated in Seattle, followed by Alaska boats (36 percent from Sand Point, Kodiak, Anchorage, Homer, and other places). Sand Point vessels would represent the local fleet for the WG. The still smaller Southeast Alaska at-risk halibut harvest is taken mostly by relatively local Alaskan boats (75 percent – Sitka, Ketchikan, Petersburg, Wrangell, and a number of other places) and most of the rest by boats from Washington (greater Seattle area and other places).

Comparatively few halibut vessels would be affected by closure areas in the EBS, although those vessels would comprise approximately 25 percent of the EBS halibut fleet (42 of 166 vessels). Based on 2001 data, of the 42 vessels with at-risk revenues, 21 are owned in Alaska, 12 in Washington, 6 in Oregon, and 3 in other states. Of the Alaska vessels, eight are from St. George, seven are from Kodiak, four are from Homer, and the remaining two vessels are from Juneau and Sitka. With the exception of the St. George local fleet, all of the halibut vessels with at-risk revenues are long-range vessels from outside the EBS area itself. While St. Paul vessels do not show as being affected in the 2001 data, St. Paul-owned vessels have fished these areas in other years, and halibut caught in these areas by vessels from outside the community have consistently been landed and processed in St. Paul. While Alaska accounts for fully half of all vessels with revenue at risk, these vessels account for only about 28 percent of revenue at risk itself. Most of this revenue is associated with boats from Kodiak and Homer. Small boats from St. George account for 3 percent of the revenue at risk, but it is important to note that Alternative 6 would likely shut down the entire St. George small vessel fleet because all waters near the island would effectively closed to halibut fishing (see discussion below). While there is year-to-year variation, 16 different boats from St. George have harvested halibut in areas that would be closed by Alternative 6 since 1998. Washington boats account for 46 percent of the halibut revenue at risk, and Oregon and other states account for about 26 percent.

For the AI area, based on 2001 data, 33 halibut vessels would have revenue at risk under Alternative 6, which is about 54 percent of the total AI halibut fleet (61 vessels). Of the affected vessels, 21 vessels are owned in Alaska, with the balance owned in Washington. Ownership is concentrated in Juneau (seven vessels), Kodiak (five vessels), and Homer (four vessels), while Atka, Gustavus, Petersburg, Seward, and Sitka residents own one vessel with at-risk revenues each. Among Alaska vessels, all are long-range vessels from communities outside the AI area, with the exception of the single vessel from Atka.

In terms of overall halibut revenues at risk, 9 percent is associated with the EBS and 7 percent is from the AI. The EBS at-risk halibut revenue is taken mainly by Washington boats (46 percent) and Alaska boats (28 percent). Most of the Alaska total is represented by vessels from Kodiak, Homer, and St. George. The St. George fleet is the only local fleet component in the at-risk EBS halibut fishery (apparently the 2001 St. Paul halibut harvest did not include any take from areas to be closed by Alternative 6). The AI at-risk halibut fishery is taken primarily by nonlocal Alaska boats (71 percent from Kodiak, Juneau, and Homer), with Washington boats taking the remainder (29 percent from at least half from the Seattle area).

Those communities with vessels representing more than 3 percent of the total revenue at risk in the halibut fishery (all regions) are Kodiak (22.8), Seattle (12.6), Homer (8.0), Sitka (4.3), Petersburg (4.0), and Seward (3.2). About 78 percent of all affected halibut boats also fish for groundfish within areas that would be closed by Alternative 6 and would, therefore, have additional revenue at risk, but this varies by region. For affected Washington halibut vessels, 89 percent also fish for groundfish in these areas, while the figures for analogous Alaska and Oregon vessels are 75 and 67 percent, respectively.

Especially for the halibut fishery (but also for other fisheries as well), Alternative 6 would have the effect of impeding potential future development of small vessel fisheries in a number of small Alaska communities, in addition to impacts to current participation already mentioned. A treatment of these potential future impacts by community is presented in a separate discussion below.

Crab Catcher Vessels

Ownership of the 180 crab catcher vessels that would be affected by Alternative 6 is concentrated in relatively few communities, as shown in Table 3.8-8. Alaska residents own 50 (28 percent) of these vessels, with 25 from Kodiak, 6 from Homer, 5 from Anchorage, 3 each from Petersburg and Sand Point, and 2 each from King Cove and Sitka. Cordova, Kenai, Seldovia, and Yakutat each have a single vessel that would be affected by this alternative. Washington state residents own 111 (62 percent) of the vessels in the affected fleet. These are highly concentrated in Seattle, with 78 vessels owned by Seattle residents. No other community in Washington has more than three vessels, and at least several of these places are part of the greater Seattle area. Oregon residents own 17 affected vessels (or 9 percent of the affected fleet). Of these vessels, 11 are from Newport, and no other Oregon community has more than 2 vessels.

As with the groundfish and halibut fleets, few communities can be discussed in terms of the value associated with local crab vessels due to confidentiality restrictions. Table 3.8-9 provides vessel count and value data aggregated by region. This table clearly shows Kodiak's dominance within Alaska, and Washington is within the overall fishery. By far the greatest number of vessels crabbed in the EBS (156 catcher vessels), while only 18 and 10 vessels fished in the GOA and AI, respectively. Of the GOA vessels, six worked in the WG, eight in the CG, and one in Southeast Alaska.

Catcher-vessel fleet percentage of crab revenue at risk by area would be more variable than anticipated for halibut revenues. In the GOA, only 2.5 percent of affected vessel status quo crab revenue would be at risk ($370,000 out of $15.34 million), while in the EBS, 36.7 percent of the analogous revenue would be at risk ($27.35 million out of $74.42). In the AI, 21.8 percent of affected vessel status quo crab revenue would be at risk ($3.55 million out of $16.27 million).

The EBS, AI, and GOA components of the affected crab fleet vary considerably in the number of vessels involved and the pattern of ownership of those vessels. The EBS crab fleet that would be affected by this alternative consists of 170 out of the 180 vessels (or about 94 percent) of the overall affected fleet and closely reflects the community distribution percentages of the affected fleet as a whole. Of the EBS crab revenues at risk under this alternative, Washington boats would account for 65.3 percent (49.6 percent Seattle boats, 15.7 percent other Washington boats); Alaska boats, 24.1 percent (14.6 percent Kodiak boats, 9.5 percent other Alaska boats); and Oregon boats, 10.2 percent (6.3 percent Newport boats, 3.9 percent other Oregon boats). Potential Alaska-dependent community impacts related to EBS catcher vessel activity would be concentrated in Kodiak. Among other Alaska communities, only Sitka, Homer, Petersburg, and Anchorage would have more than one affected vessel, and these are all relatively large communities by regional standards with comparatively diversified economies. These factors would serve to minimize the intensity of potential community level impacts.

The AI crab fleet that would be affected by Alternative 6 consists of only 11 vessels. Of these, six are owned by residents of Washington State, two by residents of Newport, Oregon, and two by residents of Kodiak, Alaska. Confidentiality concerns prevent disclosing disaggregated information about Alaska and Oregon crab components of this fleet, but Washington vessels, while accounting for over half of the affected fleet, accounted for only about one-third of the at-risk AI crab revenue. Significant impacts to dependent communities would be unlikely to result from impacts to these few vessels. However, a number of individual operations would be expected to experience adverse impacts because it is assumed that recouping at-risk revenues would be difficult, given the percentage of revenue at risk.

The GOA crab fleet that would be affected by this alternative consists of 18 vessels, 10 of which are owned by residents of Alaska. Kodiak residents own four of these vessels, Sand Point residents three, and Homer, King Cove, and Sitka residents own one vessel each. Washington residents own six of these vessels, Oregon residents one, and residents of other states own one vessel. In terms of value, however, Washington boats represent about 48 percent of the GOA crab revenue that would be at risk while Alaska boats represent a substantially smaller percentage than their number of boats would imply. More precise figures cannot be given in order to protect the confidentiality of Oregon's and other states' boats. No dependent community level impacts would be likely to be associated with GOA crab catcher vessel operations, however, given the overall small percentage of revenue at risk and the likelihood that these revenues could be recovered with a minimum of additional effort directed toward areas remaining open under this alternative.

About 88 percent of crab catcher vessel value that would be at risk comes from the EBS. Washington State boats, predominately from Seattle, represent 64 percent of the EBS at-risk crab revenue, and Alaska boats (mainly Kodiak, but also some from Anchorage, Homer, and other places) represent 25 percent. Oregon boats account for most of the rest. The AI crab fisheries represent the next largest piece of the catcher vessel at-risk crab value, at 11 percent. Washington boats represent 50 percent of this at-risk crab revenue. Alaska and Oregon boats split the other 50 percent (Oregon boats have a higher percentage than Alaska boats). Total at-risk crab revenue (all regions and for both catcher vessels and catcher-processors) for Washington-owned boats would be about $20.5 million and for Alaska boats would be somewhat less than $9.5 million – with more than two-thirds of that in Kodiak.

Those communities whose catcher vessels account for most of the at-risk revenue for the crab fishery (all regions) are Seattle (45.3 percent, but actually higher if Seattle area communities are included), Kodiak (15.7 percent), and Newport (8.3 percent). The only other nonconfidential communities are Anchorage (2.2 percent) and Homer (1.2 percent). As a whole, Alaska catcher vessels account for about 24.6 percent of the at-risk crab revenue, Washington boats for about 62.2 percent, and the combined Oregon-other states boats for about 13.3 percent. Most affected crab catcher vessels (about 66 percent) do not fish for groundfish within the areas that would be closed by Alternative 6. There are no marked regional differences in this regard, other than that Oregon-other states boats are somewhat less likely to fish for groundfish than are crab catcher vessels owned by Alaska or Washington residents.

When likely changes are combined for the different areas, it is apparent that dependent community impacts related to crab catcher vessels would be concentrated in Kodiak. While individual operations in other communities could experience a decline of harvest volume and associated revenue, direct community level impacts associated specifically with the crab fleet would likely be relatively small. However, a number of these smaller communities would also experience at least some level of adverse effects to their local fleet through groundfish and halibut impacts associated with this alternative.

In general, the crab fleet is experiencing both economic and operational uncertainty. Crab harvests in recent years have declined, making for difficult business conditions. There is a considerable amount of uncertainty regarding the future conditions because the BSAI crab fisheries are likely to be rationalized in the near future. Several alternative management structures are actively being considered, with quite different outcomes likely, depending on the ultimate alternative chosen and the set of accompanying options selected. Whichever alternative is implemented, it is likely that the composition and distribution of the crab fleet will look quite different after rationalization than it does under existing conditions due to consolidation in some form. Additional uncertainty regarding future conditions also results from the fact that a crab vessel buy-back program is also currently working its way through the study and implementation process. Taken together, these factors make it more difficult to forecast the precise nature of community impacts that are likely to result from EFH-specific changes.

Catcher Vessel Community Impacts Summary

The likely effects of Alternative 6 on communities through effects on catcher vessels are complex and interactive. Community catcher vessel fleets vary in the extent to which they diversify or participate in multiple fisheries. For example, many of the vessels participating in the EBS groundfish fisheries specialize in pollock and may also fish for some Pacific cod and perhaps for crab. Boats fishing the GOA fisheries tend to participate in more fisheries (although large pollock boats specialize more than others even there). In general, the more diversified a catcher vessel is (i.e., the more fisheries in which it participates), the better able it is to adapt to changes (and especially negative changes) in any one fishery. However, if more than one such fishery is affected at the same time, as would most likely be the case under Alternative 6, fishery diversification may actually intensify such negative effects.

Catcher vessels (and community fleets) also differ in the extent to which they participate in more local versus more distant water fisheries. EBS groundfish boats are almost all distant-water vessels – whether from the Pacific Northwest (Seattle or Newport, for example) or larger Alaska ports (such as Kodiak and Homer). Unlike the groundfish fisheries, there are small local halibut fleets in the EBS (in the Pribilofs). GOA fisheries, on the other hand, tend to have a much more local fleet character due to the participation of many Alaska vessels homeported in or near the GOA, although many vessels from the Pacific Northwest participate in GOA fisheries as distant water vessels. An important aspect of this in terms of community effects is that in a number of ways catcher vessels have direct and often more pervasive ties to the communities in which they are homeported than do catcher-processors or even locally operating fish processing plants. Catcher vessels tend to be operated by year-round community residents who hire other residents and buy goods and services locally. While catcher vessels are relatively small operations compared to other fishery entities, they are numerous and exist in communities of all sizes. In contrast, catcher-processors tend to be from larger communities, and processors are often not well integrated into the day-to-day economic flow of the communities where they operate. While often major contributors to local government revenue, a number of plants import their labor force and buy most goods and services from outside of Alaska.

Under Alternative 6, catcher vessels would be most affected by EFH measures through the pollock, crab, and Pacific cod fisheries in the EBS and the halibut, sablefish, and Pacific cod fisheries in the GOA. Those communities with a catcher-vessel fleet with significant participation in these fisheries form a relatively small class. Seattle and Kodiak stand out because of the magnitude of potential effects in one fishery, the combination of effects in multiple fisheries, or both. However, Seattle is a very large community, and while Alternative 6 effects would no doubt be significant for individual operations and industry sectors, they would not likely be significant on the community level. For Kodiak, however, the catcher fleet would face a significant percentage of their normal harvest as being at risk – an undefined percentage of EBS pollock (and some Pacific cod), about 23 percent of the total halibut at risk, about 16 percent of the total crab at risk, and a significant portion of the sablefish at risk. Halibut and sablefish are primarily GOA fisheries, where Kodiak boats participate as part of a more local fleet. It is not uncommon for Kodiak catcher vessels to participate in several of the affected fisheries, so that individual operations would certainly experience adverse impacts. Because of the number of such operations in Kodiak, there would probably be community-level economic effects as well. Much would depend on the degree to which fishing operations were successful in replacing their harvest from closed areas with harvest in areas that remain open.

Other communities also host vessels that participate in multiple fisheries, so that these communities may also experience effects from multiple fisheries. Most are Alaska communities – Homer, Sitka, and Petersburg. Newport, Oregon, may also fit in that category, although its participating vessels are fewer and less diversified in terms of fisheries. Vessels from these communities participate in the halibut, sablefish, pollock, and Pacific cod fisheries, but not in the numbers that those from Kodiak do. Many of these boats also tend to be more local or to fish strictly in the GOA than do Kodiak boats as a fleet, although many Kodiak boats also follow that pattern. Whether the effects on the fleets of these communities would achieve the threshold to cause community-level effects is not clear. Because much of the at-risk revenue is from GOA fisheries (especially halibut and sablefish) or in EBS fisheries (especially crab and to a degree pollock) in which GOA community fleets participate, Alternative 6 effects on catcher vessels would be most likely to translate into community-level effects for GOA communities. Kodiak and Homer would be the primary communities where these effects would be expected, but a number of other communities would also be affected. In terms of specific effects, much would depend on the ability of fishermen to catch fish in areas other than where they have caught them in the immediate past.

There are also a few other communities for which more fishery-specific Alternative 6 effects should be assessed. These arise because of the nature of catcher-vessel fleets from those communities. The Pribilof communities of St. George and St. Paul both have local fleets whose only harvest is halibut. There has been interest in, and some effort directed toward, including cod jigging as an additional focus for the Pribilof small-vessel fleets, but the current lack of local processing on St. George and the lack of true multi- species processing on St. Paul have limited development in this area. Vessels from St. George harvest a significant portion of the halibut at risk in Alternative 6. This fishery is an important component of the community development of St. George, and any adverse impact on it would be significant. Other effects are also possible. Although not apparent in the 2001 existing conditions data, St. Paul fishermen report that Steller sea lion protection measures and competition from nonlocal (distant water) halibut vessels have resulted in current redistribution of at least some effort to areas that would be closed under Alternative 6. To the extent that such a redistribution has occurred, potential impacts would increase. The communities of Sand Point and King Cove have catcher-vessel fleets that participate in a wide range of fisheries, many of which would be affected by Alternative 6 (pollock, Pacific cod, and halibut, especially). Vessels from these communities tend to be smaller than other groundfish vessels and so may be disadvantaged relative to the overall fleet in terms of ability to fish other areas to replace at-risk catch. The larger boats, participating in these fisheries as a distant water fleet, suffer no such disadvantage (assuming that there are other fish to be found) since this extra distance is a small percentage of their total trip. The local fleets of Sand Point and King Cove are also located such that they are also experiencing effects from Area M (salmon) management measures, as well as restrictions on fishing due to Steller sea lion measures, at the same time that the salmon fishery upon which they also depend is in poor economic shape. These factors would serve to amplify any adverse Alternative 6 impacts.

C.3.8.3.2.3 Mobile Processors

For motherships and catcher-processors, there would be revenue at risk in the groundfish, crab, halibut, and scallop fisheries. For the affected catcher-processor sector in the groundfish fishery as a whole, at-risk revenue accounts for 17.6 percent of total relevant status quo revenue ($147 million at risk out of $845.01 million). Halibut, crab, and scallop fisheries would have higher percentages of revenue at risk for the affected catcher-processors, but much lower absolute at-risk values than seen for groundfish. For halibut, 48.0 percent of the status quo revenues of affected vessels would be at risk, but this is only $60,000 out of $120,000. For crab catcher-processors, 28.6 percent of the status quo revenues of the affected vessels would be at risk ($2.85 million out of $9.97 million), while for scallop catcher-processors, 29.1 percent of the status quo revenues of the affected vessels would be at risk ($980,000 out of $3.37 million).

Groundfish Motherships and Catcher-Processors

The pattern of distribution of the mobile processor fleet by region and community that would be affected by Alternative 6 is much different than the pattern seen for catcher vessels under this alternative (Table 3.8-10). The catcher-processors are much more highly concentrated in Washington than is the catcher- vessel fleet, and those catcher-processors owned by Alaska residents are found in far fewer communities than are catcher vessels. Of the 81 catcher-processors that harvested groundfish during 2001 in areas that would be closed under Alternative 6, 65 were from Washington. Of these vessels, the vast majority (54 vessels) were from Seattle. One other Washington community had three vessels (Edmonds) and one had two vessels (Bellingham), and no other community had more than one vessel. A total of 12 catcher-processors with revenue at risk under this alternative show Alaska ownership. No Alaska community had more than three locally owned catcher-processors: three were from Petersburg;

two were from Kodiak; two were from Unalaska; and one each was from Anchorage, Homer, Seward, and Sitka. Four catcher- processors were from other states. All four affected motherships have Seattle ownership.

As was the case for the catcher-vessel fleets, revenue data cannot be disclosed for most communities with catcher-processors due to confidentiality restrictions. Table 3.8-11 presents affected mobile processor ownership by aggregated area, while Table 3.8-12 provides revenue information for these same groupings. The strong dominance of this sector by Washington-owned, catcher-processors is clear from the information shown ($847.64 million out of $888.90 million in total revenues for these vessels).

An important distinction between Alternative 6 and the other alternatives considered with respect to catcher-processors is the type of catcher-processor operation likely to be affected. Under the other alternatives, head and gut vessels were the primary type of operations likely to experience most of the impacts. For Alternative 6, a much larger range of groundfish catcher-processors would be affected, up to and including the largest classes of BSAI pollock- and Pacific cod-oriented catcher-processors. Of the 81 catcher-processors that fished for groundfish in 2001 in areas that would be directly affected by Alternative 6, 79 fished for Pacific cod, 77 fished for pollock, 62 for shelf rockfish, 42 for flathead sole, 43 for Arrowtooth flounder, 47 for sablefish, 39 for rock sole, 34 for yellowfin sole, 30 for Atka mackerel, 16 for Rex sole, and 76 for other groundfish. Harvest diversity information is less detailed for the four motherships active in 2001, but this lack of detail has little bearing on understanding overall patterns. All four processed pollock and cod, while two processed other groundfish as well. However, 98.7 percent of the first wholesale value of their groundfish production was pollock, and industry sources indicate that this is an accurate reflection of current mothership operational dynamics. Species other than pollock are generally too dispersed to process unless pollock is being processed at the same time. These motherships operate in the EBS and possibly the AI when in Alaska waters.

In terms of groundfish species harvested by catcher-processors in the GOA, six fisheries would have an at-risk revenue of $10,000 or more. Flathead sole has a relatively modest amount at risk ($40,000, or 5.5 percent of a status quo value of $770,000). Arrowtooth flounder revenues at risk would be $440,000 (or 13.2 percent of the status quo revenues of $3.37 million for the affected fleet), Rex sole at-risk revenues would be $870,000 (or 17.3 percent of the status quo revenues of $5.02 million for the affected fleet), Pacific cod at-risk revenues would be $960,000 (or 13.5 percent of the status quo revenues of $7.09 million for the affected fleet), sablefish at-risk revenues would be $1.37 million (or 18.7 percent of the status quo revenues of $7.35 million for the affected fleet), and rockfish at-risk revenues would be $1.83 million (or 28.5 percent of the status quo revenues of $6.41 million for the affected fleet). Alaska-owned vessels participating in these fisheries ranged from two (Rex sole) to seven (Pacific cod, rockfish), with intermediate numbers in the others (three each in flathead sole and arrowtooth flounder, five for sablefish). With the exception of one to five vessels in any given groundfish fishery, the rest of the catcher-processors that would be affected (that is, the vast majority) are from Washington. Given the distribution of the fleet, no significant dependent community impacts associated with the GOA catcher-processor fleet would be anticipated for Alaska communities. While individual operations may experience adverse impacts under this alternative, the relatively small number of vessels in communities that are relatively large and economically diversified by Alaska standards are likely to make the impacts less than significant at the community level.

In general, the revenues at risk for groundfish catcher-processors would be much higher for the EBS than the GOA. In terms of groundfish species harvested by catcher-processors in the EBS, nine fisheries would have an at-risk revenue of $10,000 or more.

- Two of these would have relatively modest revenues at risk of under $100,000: arrowtooth flounder ($80,000 at risk, or 2.3 percent of the status quo revenue of $3.40 million) and the residual category of other groundfish ($70,000 at risk, or 13.6 percent of the status quo revenue of $540,000).
- Other fisheries with revenues up to $3 million that would be at risk are Greenland turbot ($790,000 at risk, or 31.1 percent of the status quo revenue of $2.55 million), other flatfish ($1.73 million at risk, or 40.1 percent of the status quo revenue of $4.32 million), flathead sole ($1.84 million at risk, or 12.7 percent of the status quo revenue of $14.46 million), and rock sole ($2.42 million at risk, or 10.2 percent of the status quo revenue of $23.62 million).
- Three fisheries would have revenues between $10 million and $100 million at risk: yellowfin sole ($10.65 million at risk, or 30.1 percent of the status quo revenue of $35.39 million), Pacific cod ($23.22 million at risk, or 18.4 percent of the status quo revenue of $126.14 million), and pollock-mid-water ($96.11 million at risk, or 18.3 percent of the status quo revenue of $525.16 million).

Depending on the individual fishery involved, between two and nine of the EBS catcher-processors were owned by Alaska residents in 2001 and one to six vessels were owned by residents of states other than Washington. The balance (that is, most of the overall fleet) was owned by Washington residents. Nearly all of the largest vessels in the fleet were owned by Washington residents (although Alaska investment – particularly CDQ investment – and partial ownership of the Washington-owned vessels has grown in recent years). Similar to the situation seen in the GOA, given the distribution of the fleet, no significant dependent community impacts associated with the EBS catcher-processor fleet would be anticipated for Alaska communities. While individual operations may experience adverse impacts under this alternative, the relatively small number of vessels in communities that are relatively large and economically diversified by Alaska standards would make the impacts less than significant at the community level. Otherwise, impacts would be concentrated largely in the Seattle area.

All four motherships operate primarily in the EBS and concentrate on pollock. Under the American Fisheries Act (AFA), the BSAI pollock fishery was essentially allocated to harvest vessels, based on their historic participation in the fishery. Thus, catcher-processors as a sector have a stable and known production level. Motherships have no such direct allocation, but do have a stable and known production level through the allocations of the catcher vessels that delivered to them historically. Individual mothership operations must compete for the deliveries from this pool of catcher vessels (as shore plants must compete for deliveries from catcher vessels delivering shoreside). At present, the pollock allocations to mothership catcher vessels have been sufficient for those operations in existence when AFA was implemented to remain in business. If EFH constraints impose additional costs on these operations, or if at-risk pollock cannot be replaced with pollock harvested in other areas, it is likely that at least one operation would be very adversely affected. Catcher vessels that deliver to motherships tend to be more constrained by weather and sea conditions, so that EFH area constraints may hamper their ability to replace at-risk pollock more than for shoreside catcher vessels (or catcher-processors). These effects are not likely to have significant community (Seattle) effects, but would certainly be significant for the industry sector (both the processor operations, as well as the catcher-vessel fleet).

In terms of groundfish species harvested by catcher-processors in the AI, six groundfish fisheries would have revenue at risk over $10,000. Of these, five would have between $10,000 and $100,000 at risk, with the remaining one having over $2 million in revenues at risk. The fisheries with revenues at risk of under $1 million would be rock sole ($40,000 at risk, or 10.5 percent of the status quo revenue of $360,000), Greenland turbot ($220,000 at risk, or 53.9 percent of the status quo revenue of $410,000), sablefish ($770,000 at risk, or 14.1 percent of the status quo revenue of $5.47 million), Atka mackerel ($890,000 at risk, or 2.2 percent of the status quo revenue of $41.18 million), and other groundfish ($30,000 at risk, or 17.2 percent of the status quo revenue of $200,000). The single fishery having over $1 million at risk would be Pacific cod ($2.32 million at risk, or 7.7 percent of the status quo revenue of $29.92 million). The catcher-processor ownership pattern for vessels with at-risk revenue is similar to that seen for the EBS fisheries, as are the likely catcher-processor-associated impacts to Alaska-dependent communities.

Halibut, Crab, and Scallop Catcher-Processors

There are several different catcher-processor fleets that would be affected under Alternative 6. While groundfish catcher-processors also process a range of nongroundfish species, there are specialized and distinct crab and scallop catcher-processor fleets. Potential revenues at risk for these fleets may be smaller than those for the groundfish catcher-processor fleet, but overall revenues are also smaller. This means that these fleets could experience disproportionate impacts relative to the groundfish fleet. There is some double counting between fleets because, for example, catcher-processors that process significant amounts of both groundfish and crab may show up in the data for both fleets. However, there is enough of a distinction between the types of operations and the distribution of the fleet to make separate discussions important for understanding the likely range of associated impacts under this alternative.

Halibut Catcher-Processors

While a handful of vessels appears as halibut catcher-processors in the database used for this analysis, there are no true halibut catcher-processors as a distinct fleet comparable to the groundfish and crab catcher-processors. Groundfish catcher-processors run halibut in limited numbers as part of their operations. For the purposes of this analysis, however, the four vessels listed as halibut catcher-processors (three from Alaska [Anchorage, Sitka, and Gustavus] and one from Washington) in the database are treated as halibut catcher vessels with regard to potential dependent community impacts associated with halibut activities.

Crab Catcher-Processors

Only six crab catcher-processors would be affected by Alternative 6. Of these, five are owned by residents of Seattle and one by a resident of Kodiak. Due to confidentiality restrictions, crab catcher-processor revenues for Alaska cannot be discussed separately. The total at-risk revenue for catcher-processors under this alternative is $2.85 million (compared to at-risk revenues for crab catcher vessels of about $31.26 million). This is split into $1.10 million at risk in the EBS (17.6 percent of a total status quo revenue of $6.27 million) and $1.75 million at risk in the AI (47.3 percent out of a total status quo revenue of $3.69 million). There is no status quo revenue for catcher-processors in the GOA. Given the distribution of the fleet, adverse impacts would be concentrated in Seattle and Kodiak. No significant community level impacts associated with the catcher-processor fleet are anticipated for Seattle or Kodiak, although individual operations may be affected significantly if at-risk crab cannot be replaced by fishing in alternative areas.

Scallop Catcher-Processors

For scallops in the GOA, 34.3 percent of affected catcher-processor status quo revenue would be at risk ($940,000 out of $2.74 million) under Alternative 6. Scallop status quo revenues are much lower for both the EBS and the AI. In the EBS, less than $10,000 in revenue would be at risk (out of a total status quo revenue of $580,000 for the affected vessels), while in the AI, $50,000 in revenue would be at risk out of a total status quo revenue for the affected fleet of only $60,000.

As detailed in Section 3.4.1.4.4 of the EFH EIS, existing conditions for the scallop fishery have changed substantially in recent years with the implementation of a license limitation system and the formation of a co-op within the fishery, which served to decrease the number of participating vessels. In 2001, about 31.8 percent of the Alaska scallop harvest was taken from waters that would be affected by Alternative 6. While (at least in some recent years [since 1998]) multiple vessels from Kodiak along with single vessels from Kenai, Anchorage, and Ester, Alaska, show harvests in the areas that would be affected by Alternative 6, the 2001 at-risk harvest was taken by three vessels, none of which was owned in Alaska – two were from Washington, and one from another state. Most of the 2001 harvest that would be at risk under Alternative 6 was taken by one vessel. The total harvest was taken from the GOA, and none of these vessels fished for groundfish in areas that would be affected by Alternative 6. The scallops harvested by the vessels discussed above were often processed on board the vessel; however, relatively small amounts were processed by other entities. In 2001, the at-risk scallop harvest was, at least in small part, processed by five processors – two from Washington, two from Alaska (Kodiak and Yakutat), and one owned in another state. Due to the small number of vessels involved and the fact that, at least recently, none of the at-risk harvest has been taken by Alaska vessels, no dependent community impacts appear likely from connections to scallop catcher-processor vessels. As detailed in an earlier section, significant impacts to a number of the catcher-processors and the fishery as a whole are likely under this alternative; however, it is not apparent that these would translate into dependent community impacts for Alaska communities or those in Washington or other states.

Catcher-Processor and Motherships Community Impacts Summary

Overall, community impacts associated with catcher-processors under Alternative 6 would be concentrated in Seattle, with a few exceptions. These exceptions include the few communities in Alaska with individual catcher-processor ownership, and CDQ entities with group ownership interests in catcher-processors.

Although there would likely be adverse impacts to a number of the fishery participants in the catcher-processor sector, impacts to Seattle as a community would potentially be insignificant due to the size and the diversity of the local economy and the fact that the workforce for the catcher-processor sector is not drawn from any single community. Catcher-processor employment, at least for the processing positions for vessels owned by Seattle residents, is mostly transient and drawn from a large region, primarily the Pacific Northwest, but also includes other western states in the continental United States, as well as Alaska. Mothership operation ownership is concentrated exclusively in Seattle. As is the case with catcher-processors, while individual operations may experience adverse impacts under this alternative, no community-level impacts are anticipated associated with motherships.

Catcher-processor-related impacts to Alaska communities under Alternative 6 would accrue to few communities (primarily Kodiak, Petersburg, and Unalaska). As detailed earlier, however, community-level impacts associated specifically with catcher-processors would potentially be less than significant. Impacts directly associated with catcher-processors, due to the mobile nature of their operations and their limited numbers, would be much less apparent in engaged communities than are larger catcher-vessel fleets and continuously present shoreside processors. The activities of these latter two groups also tend to generate more indirect local activity than catcher-processors due to more frequent local activity. Catcher-processor support service businesses are, however, important for some Alaska communities, especially Unalaska and, in more recent years, Ketchikan. CDQ group investments in the catcher-processor fleet have grown substantially in recent years, and CDQ communities would be vulnerable to adverse impacts to the Seattle catcher-processor fleet with whom they partner or with whom they have capital invested. The level of significance of these impacts would depend on a number of factors and is unknown at this time.

C.3.8.3.2.4 Shoreside Processors

As shown in Table 3.3-3, the total first wholesale value at risk of catch delivered inshore for processing represents approximately 21 percent of the total status quo value ($53.61 million out of $261.26 million) of the relevant fisheries of the GOA area, about 23 percent for the AI area ($7.97 million out of $35.04 million), about 14 percent for the EBS area ($71.20 million out of $514.54 million), and about 16 percent for all areas combined ($132.77 million out of $810.84 million), but no breakdown by port of landing is available. Caution must be exercised in the interpretation of these wholesale value data as (1) they are not additive with ex-vessel values presented above, and (2) they cannot be used as a proxy for potential levels of impacts to specific communities without considering the basic caveats laid out in the introductory paragraphs of Section C.3.3.3.2.4 of the Alternative 2 discussion. Overall revenue at risk is more than 33 times greater for any of the other alternatives. The following sections provide information on potential processor-related community impacts by major species group by community.

Groundfish Shoreside Processors

Shoreside groundfish processors include both floating processors and shore plants. While theoretically mobile, floating processors are defined as inshore operations by inshore/offshore and AFA-related management structures, and they function as fixed operations during processing seasons. From the perspective of community impacts, shore plants and floaters may be very different types of operations. In some cases, floaters may operate outside of communities or boroughs, while in other cases they may operate within communities and function effectively as shore plants from the community perspective. Shore plants (and floaters) vary from operation to operation and community to community in the degree to which they are integrated with the local economy or act as an enclave outside of the day-to-day workings of the community.

Table 3.8-13 provides a detailed community distribution of groundfish shoreside processors that took deliveries from catcher vessels with at least part of their catch in 2001 from areas that would be affected by Alternative 6. As shown, 60 shore plants in 36 Alaska communities over a very wide area ran product from these vessels, along with 1 entity in Seattle. Of the four floaters that took delivery from potentially affected vessels, two were in Alaska (Akutan and Unalaska), and two were in Seattle.

Groundfish processing value information cannot be disclosed for most communities due to confidentiality restrictions. Table 3.8-14 provides processor count information by aggregated area, and Table 3.8-15 provides processor revenue data by those same groupings. For the groundfish fisheries, the predominance of the Aleutians West Census Area (including Unalaska, among other communities), the AEB (including Akutan, King Cove, and Sand Point, among others), and Kodiak are clear from these data.

Halibut Shoreside Processors

Because of confidentiality restrictions, comparatively little information can be provided by community or even area for halibut shoreside processors. Overall, 88 percent of the at-risk halibut is processed in Alaska, 7 percent in Washington, and 4 percent is unknown. In terms of the CG, 90 percent of the at-risk halibut in 2001 was processed in Alaska. Kodiak processors accounted for 35 percent of this, followed by Homer and Seward (confidential percentages). Many other places accounted for small percentages. For the WG, Alaska processors accounted for 88 percent of the regional at-risk total. Percentages are confidential, but a list of significant places is Homer, Kenai, King Cove, Kodiak, Ninilchik, Sand Point, Seward, and Unalaska. For Southeast Alaska, processors in Alaska communities accounted for 94 percent of the at-risk halibut, primarily in Juneau, Ketchikan, Petersburg, Sitka, and Wrangell.

The EBS at-risk halibut fishery was similarly processed primarily in Alaska (93 percent) – Homer, Seward, and Unalaska being the three busiest communities in that regard. The AI at-risk portion of the halibut fishery was processed 75 percent in Alaska (11 percent unknown), primarily in Anchorage, Atka, and Unalaska.

Nine communities each processed at least 2 percent, and together 79.2 percent, of the total (all regions) at-risk halibut fishery. In alphabetical order, they were Bellingham, Homer, Kenai, Kodiak, Ninilchik, Sand Point, Seward, Sitka, and Unalaska. Among this group, the individual community figures can be disclosed only for Kodiak, at 21.3 percent of the at-risk harvest, and Unalaska, at 8.8 percent of the overall at-risk harvest. A total of 4.1 percent of the at-risk harvest is taken by vessels in the unknown community category in the database.

Crab Shoreside Processors

The EBS crab fisheries represent 87 percent of the catcher vessel at-risk crab value. The EBS at-risk catcher vessel crab is delivered, as might be expected, primarily to shore plants located in Alaska. Unalaska receives more of the EBS at-risk catcher vessel crab value (40 percent) than any other community, but confidentiality restrictions prevent a ranking of other Alaska communities in terms of processing. The top six Alaska communities processed about 85 percent of the EBS catcher vessel at-risk crab value in 2001. In alphabetical order, they are Akutan, King Cove, Kodiak, Petersburg, Saint Paul, and Unalaska. Each had more than $1.5 million of affected vessel crab value processed locally in 2001. For processors, the AI catcher vessel at-risk crab value can be discussed only at the level of all processors, or in qualitative terms. Most is processed in Kodiak and Unalaska. Overall, the at-risk crab value would affect the same six EBS communities that were the largest AI crab processors in 2001. Processors in Unalaska processed about $13.8 million of at-risk catcher vessel crab in 2001(all BSAI region). Kodiak processors also processed a significant amount (precise numbers for shore processors are confidential to avoid divulging information for the one catcher-processor from Kodiak), as did four other Alaska communities (confidential due to low processor numbers).

St. Paul may be a special case in terms of shoreside processing-related community impacts for the crab fishery under Alternative 6. This alternative would place 30 percent of the EBS opilio crab revenue at risk, by far the species most commonly processed on St. Paul. With the decline in the overall fishery in recent years and the potential for flow of processing away from the Pribilofs under crab rationalization, the impacts of Alternative 6 associated with shoreside processing could be profound. While two of the three alternatives currently being considered for BSAI crab rationalization incorporate a regionalization component in order to provide some protection to communities (especially the Pribilofs) against sudden loss of crab production capacity (and the municipal revenues that accompany landings and processing), these protections are not assured at this time. Even if such protections were in place, the crab fleet may find it difficult to find sufficient crab to replace that lost to restricted areas and still deliver it in a cost-efficient way to St. Paul within a regionalized crab management system.

Specialty or Niche Types of Shoreside Processors

Several other types of processors exist, although details of how such enterprises operate can be spotty. Four such categories of processor are discussed here:

- Catcher/Shore Processor. A shore-based fishing operation that also processes its catch onshore (perhaps smoking operations and such).
- Catcher/Seller. A shore-based operation that sells its catch directly to consumers (over the dock or at a market). Such enterprises cannot process their catch. They may head, gut, and ice their catch, but they may not freeze it.
- Catcher/Exporter. Essentially the same as a catcher/seller, except that it sells outside of the country.
- EEZ Operator. An offshore operation that fishes in the EEZ in a fishery for which the management has been deferred to the state of Alaska.

The existing conditions count of these types of operations, along with the count of those that would be affected by Alternative 6, is given in Table 3.8-16. It can be seen that while such operations are not uncommon, they are not numerous. In 2001, as a measure of existing conditions, there were total operations that processed groundfish. Of these 59 operations, 50 were located in Alaska. Similarly, Alaska communities dominated in these operations for halibut (22 of 28), crab (23 of 32), and salmon (23 of 30). There was no large concentration of such enterprises, with many communities being home to one or a handful of operations. Those communities with more than one such enterprise were Sitka (six catcher/shore processors), Kodiak (four catcher/exporters), Homer (two catcher/shore processors, two catcher/exporters), Petersburg (three catcher/sellers), Haines (three catcher/shore processors), King Cove (three catcher/exporters), Sand Point (three catcher/exporters), Juneau (three catcher/exporters), Wrangell (two catcher/shore processors), and four communities each with two catcher/ exporter operations (Unalaska, Old Harbor, Anchorage, and Douglas). Catcher/seller operations were the most numerous, and Pacific cod was the most common species of fish in such operations. Pollock was the least common groundfish for these operations.

None of the alternatives except for Alternative 6 would affect more than five of these operations, which is likely to be an insignificant effect in terms of fishery-dependent communities. Alternative 6 has the potential to affect approximately 33 percent of all such groundfish, halibut, and salmon operations and about 25 percent of the crab operations. Given the usual small scale of these operations and their dependence on and adaptation to local conditions, it is not possible to predict how such operations would fare under EFH regulations. It is possible that Alternative 6 may, in fact, provide more opportunities for small niche marketers of specialty product, or it could just as easily upset the conditions that have fostered the development of this sort of operation in any given community. These effects are likely to be felt at the individual, household, and enterprise levels, however, and not at the community level.

Shoreside Processors Community Impacts Summary

Analysis of potential community effects due to Alternative 6 on shoreside processors is less straightforward than for other sectors. Initially, how communities are affected by shore plants depends upon how those shore plants are affected by catcher vessels that are affected by Alternative 6-related changes. Secondly, the quantitative information available on processors is less amenable to analysis and more subject to confidentiality restrictions than the vessel-related information.

The primary avenues for Alternative 6-related effects on processors to affect communities would appear to be related to a limited number of fisheries:

- EBS crab
- EBS pollock and, to a lesser degree, EBS Pacific cod
- GOA halibut
- GOA sablefish
- GOA rockfish
- GOA Pacific cod

Shore plants located in the EBS communities did not process at-risk GOA fish in 2001, but processors located in GOA communities did process at-risk BSAI crab that same year.

In the EBS, Unalaska processors would potentially be affected by Alternative 6 through the crab, pollock, and Pacific cod fisheries. These three fisheries represent a significant (and typically predominant) percentage of Unalaska shore plant production, and any reduction in the volume of fish would translate into direct effects on these operations. In addition, these shore plants (and the deliveries associated with them) are an important source of tax revenue to the communities in which they are located, primarily through fish taxes. Reductions in volumes of fish processed would translate directly into reduced community tax revenue. The degree to which potential Alternative 6 effects would be realized would depend on the ability of the catcher fleets that deliver to these plants to replace the at-risk fish with harvest from areas where they have not fished in the immediate past. Even if the volume could be replaced, if catcher vessels incur increased costs that must be passed on to the processors, some operational effects are possible (although this may actually increase tax receipts for communities). Given the relatively large amount of fish and crab involved, some degree of effect, at least in terms of fish tax revenues, can be anticipated. Other EBS shore plant locations cannot be discussed in detail due to confidentiality restrictions. The plant in Akutan is probably similar in potential effects to those in Unalaska.

The Pribilofs, and especially St. Paul, may be a special case in terms of potential impacts due to effects on processors from multiple fisheries affected by Alternative 6. The processor(s) in St. Paul rely very heavily on opilio crab and have also processed halibut in recent years. The local catcher-vessel fleet relies strictly on halibut, but local halibut processing is reported to be highly dependent upon crab processing in the sense that halibut alone would not induce a processor to operate on St. Paul (although crab processing in the absence of halibut processing has been viable). Local halibut processing relies on deliveries from outside vessels, as well as local vessels. The boats that would have at-risk revenues under Alternative 6 that delivered halibut in recent years to St. Paul were from Gig Harbor, Homer, Kodiak, Newport, Seattle, and St. Paul itself (although the data show St. Paul vessels delivering at-risk revenue catch only in 2000). Amounts processed in the community are confidential, but halibut numbers taken from the areas to be closed by Alternative 6 were modest from 1998 to 2000, before rising substantially in 2001. The effects of Alternative 6 on these processing dynamics are uncertain, particularly because crab processing in the Pribilofs has varied in the past. A number of apparently unconnected services available in the community are often related to local processing and fishing activities. For a given community, for example, the frequency of air service may decrease (along with the capacity of the planes used for this service), and the costs of air passenger and cargo service may increase, if commercial fishing-related demand decreases significantly or ceases. This is certainly the case in the Pribilofs and Adak, as well as in many of the smaller communities in the GOA. Similarly, surface shipping-related services are also affected by the presence of local processing. In the case of St. Paul, for example, the container-shipping operation that serves the local processor's needs also serves the community. Ships returning to the community with empty containers for the processor also bring non-fishing-related goods at reduced cost. If local processing were discontinued, special cargo deliveries would have to be arranged to meet community needs, and the costs of shipping goods would increase significantly. This is also a common situation for other small communities, and these types of air and sea transportation-related impacts have an effect on the cost of living, as well as on the general quality of life in these communities.

GOA processors are concentrated in Kodiak, and Kodiak processors would potentially be affected through the GOA halibut, sablefish, rockfish, pollock, and Pacific cod fisheries. In addition, Kodiak processors (and others in the GOA) have processed an increasing amount of EBS crab from 1998 to 2001. The dependence of any processor on this mixture of fisheries was not available for this analysis, but potentially a significant percentage of the fish Kodiak processors have depended on in the past would be at risk. The degree to which the catcher fleet that delivers to these plants can replace those fish at risk would determine the extent of effects. The catcher fleet is composed of both local and nonlocal (distant waters) vessels, which differ in their capabilities in harsh weather and sea conditions. Assuming that alternative locations for productive fishing exist to replace those closed by Alternative 6, potential effects on the catcher fleet should be at least partly mitigated.

Other processors in Sitka, Petersburg, and perhaps other locations could also be affected in similar ways to those in Kodiak, although the number of vessels delivering to them is fewer than for Kodiak. Their fleets tend to be more local and, thus, may be less able to find productive alternative fishing areas to those that would be closed by Alternative 6. These processors would be more affected by the halibut, sablefish, rockfish, Pacific cod, and, in some cases, the EBS fisheries than the pollock fishery.

Information sufficient to discuss potential effects on communities due to effects on niche processors is not available. The loss of such enterprises could be significant for small communities, and small vessels and these processing enterprises/outlets may be quite interdependent in such locations.

C.3.8.3.2.5 Multi-Sector Impacts

Individual communities would experience different outcomes resulting from Alternative 6 based on a variety of factors involving the specific attributes of local fishery engagement and dependency. Different communities have various constellations of local fleets, processors, and support service sectors. Communities also differ in the way municipal revenues are derived from fisheries-related activities including, in some cases, local raw fish taxes, business taxes, sales taxes, fuel taxes or transfer fees, fees for the provision of services, or similar mechanisms in various combinations. Communities also variously derive fishery-associated revenue benefits from the resource landing tax and state shared taxes. In the case of boroughs, communities that have little if any direct engagement in commercial fisheries may substantially benefit from fishery-related revenues generated in other communities within the borough, or activities outside of city boundaries but still within borough jurisdiction. Other benefits vary from community to community based on a number of factors, including the presence and composition of local private sector businesses that, to varying degrees, may derive revenue or income directly or indirectly from fisheries-related activities.

The fisheries themselves are also different in ways that would serve to channel impacts differently depending on a community's relative dependency between fisheries. For example, some fisheries that would be affected by Alternative 6 are managed quite differently than others. The halibut fleet is fully rationalized under an IFQ management approach, EBS pollock is partially rationalized under a harvester cooperative allocation system, and the crab fleet still participates in derby-type fisheries. These different management systems would likely lead to differences in the relative ability to recover revenues, perhaps for the fishery as a whole, but certainly for individual fishing enterprises (vessels) within each fishery. All other things being equal, if there are fish to be found to replace those harvested in the past in areas that would be closed by Alternative 6, rationalized fisheries give the best chance for each individual vessel to do so, because rationalization imparts quasi-property rights to a known share of the TAC to each quota holder (or group of cooperating operations), whether large or small. Under rationalized fishing rules (e.g., ITQ, QS, cooperatives), no vessel (or cooperating group of vessels) can increase its relative harvest share without lawfully acquiring harvesting rights from someone else in the fishery willing to part with those rights. Under open access fishing rules, on the other hand, vessels would be expected to display a differential pattern of success in replacing at-risk catch and revenues (i.e., the race for fish goes to the swiftest, most technologically advanced, most seaworthy, vessels). This, in turn, would lead to different community outcomes.

As noted earlier, Alternative 6 would potentially affect a number of different fisheries. While often managed more or less independently, for many fishing enterprises these different fisheries are highly interdependent. Thus, impacts to fisheries-dependent communities under Alternative 6 would be interactive and would vary by fishery and relative community dependence upon particular fisheries (through individual sectors or combinations of sectors). While the groundfish harvest database used for this analysis currently does not have information on the region from which vessels caught their fish, those fisheries for which such information exists for 2001 (halibut and crab) indicate that GOA fishing fleets that would be affected by Alternative 6 tend to be more local than affected BSAI fishing fleets (with some exceptions). The same Alaska communities tend to have the greatest number of vessels participating in the halibut and crab fisheries as in groundfish – Kodiak, Homer, Sand Point, Petersburg, and Sitka. Kodiak vessels also participate heavily in EBS fisheries. All of these communities are heavily engaged in fishing, and several are relatively dependent upon fishing, with Sand Point perhaps the most extreme case. Several communities stand out as likely to experience multi-sector impacts from Alternative 6.

Kodiak, as mentioned in earlier sector discussions, is engaged in the most heavily affected GOA and BSAI fisheries through its local groundfish, halibut, and crab catcher-vessel fleets, locally owned catcher-processors, and locally operating shoreside processors. No other Alaska community has the same depth of multi-sector engagement with fisheries at risk under this alternative. Kodiak is predominant in virtually all the major catcher vessel fisheries, with the exception of the BSAI halibut fishery. As a community, Kodiak derives substantial benefits from support service activities, as well as through public sector means, such as harbor fees. While Kodiak has a relatively large and diversified economy, multi-sector impacts from the different fisheries would likely be evident at the community level. Impacts may also have been felt in other Kodiak Island Borough communities as a result of a decline in borough revenues generated by fishing-related activities in Kodiak.

Within the AEB, Sand Point would experience multi-sector impacts through substantial catcher-vessel participation in the major at-risk GOA groundfish fisheries, the EBS pollock fishery, the GOA halibut fishery, and through local shoreside processing of at-risk harvests. Sand Point, in general, is heavily engaged in and dependent upon commercial fishing; as noted earlier, a number of other factors that have weakened local commercial fisheries make Sand Point especially vulnerable to any level of impact from EFH-related actions. King Cove, also within the AEB, would experience similar impacts, but likely to a lesser degree due to an apparently lower level of engagement in at-risk fisheries. Impacts may also have been felt in other Aleutians East Borough communities as a result of a decline in borough revenues generated by fishing-related activities in King Cove and Sand Point.

St. George and St. Paul in the Pribilofs would experience a range of local fleet and processor impacts. While at present only St. Paul has local processing, the local St. George catch is currently tendered to St. Paul, meaning adverse impacts to St. Paul processors would likely be felt in both communities. St. Paul itself is particularly vulnerable to adverse impacts to opilio processing under this alternative.

Within the Kenai Peninsula Borough, Homer is a port of ownership for vessels that harvest a substantial portion of the at-risk catch in the major GOA groundfish fisheries and BSAI groundfish fisheries and, thus, would be affected by Alternative 6 primarily through its local fleet. Processing would be affected relatively little compared to some other communities. The Kenai Peninsula Borough community of Seward would also feel impacts through its local fleet, but to a lesser degree than Homer. Overall, due to a diversified, road-connected local economy and their relatively large size, these communities are less dependent on fishing in general than either Kodiak or the AEB communities noted. While individual sector impacts may involve higher values than seen for the AEB communities, Homer and Seward would be expected to be less adversely affected at the community level than are Kodiak and the AEB communities.

The Southeast Alaska communities of Sitka and Petersburg are involved in a number of affected fisheries through both local catcher-vessel fleets and shoreside processing and, in the case of Petersburg, through catcher-processor ownership. In general, however, dependency on Alternative 6 at-risk revenues would generally be lower for these communities than that seen in some of the other communities, due to the size of the local fleets and the overall relative size and diversity of the local economies.

Unalaska would experience impacts primarily through local shoreside processing, but there is some local ownership of affected catcher-processors as well. Unalaska has a relatively large fisheries economic sector, so it is not likely that the level of risk associated with Alternative 6 would be significant at the community level, although a degree of uncertainty for processor impacts remains.

Alternative 6 would also likely have resulted in impacts to employment and income for fishing vessel crew members from non-fishing Alaska communities working on vessels owned by residents of other communities. Documenting the residential patterns of all potentially affected crew members is, however, beyond the scope of this analysis. This alternative would likely have resulted in indirect impacts in a number of both fishing and non-fishing communities in the form of decreased fishery-related transportation demand that, in turn, would have resulted in increased costs of goods and services in general for some of the more remote communities. The data to quantify such impacts are, however, not available. Community Development Quota (CDQ) in western Alaska would also have been vulnerable to adverse impacts under this alternative, but the level of significance of these impacts would depend on a number of factors and is unknown at this time.

Seattle would experience a wide range of impacts under Alternative 6. Seattle is the most heavily engaged of any community in the at-risk fisheries in terms of catcher vessel, catcher-processor, and mothership participation, and it is the dominant center of shoreside processor ownership as well. Given the size and the diversity of the local economy, however, Seattle cannot be considered a community that is dependent upon the affected fisheries, despite the fact that if Seattle engagement were to end, a number of the affected fisheries would be a fraction of their current size. While individual operations and sectors based in Seattle may experience adverse impacts under this alternative, community-level impacts are not forecast for the city.

C.3.8.3.2.6 Small Boat Fleet Impacts from Near-Community Closures

As noted earlier, Alternative 6 features large closure areas close to a number of communities. This could result in profound localized impacts for a number of communities with small-vessel-based fleets through the closure of a significant portion of (or even all) waters within the range of small vessels. In addition to having impacts on communities already engaged in, or dependent on, a range of fisheries, this alternative would also make it more difficult, if not impossible, for a limited number of other communities to develop small-vessel-based commercial fisheries in the future due to permanent closures of nearby waters. While it is impossible to quantify these future effects that may or may not occur, closure areas near communities would create different potential futures with and without Alternative 6.

The actual range of community small-vessel fleets varies considerably based on a number of factors, including the size of vessels in the fleet and nearby ocean conditions. All things being equal, larger vessels have greater range, as do fleets from communities with relatively protected nearby waters.

As a simplifying assumption, the first step in identifying those communities most likely to experience small-vessel-related impacts (or potential future impacts) due to nearby closures was to consider coastal communities within 20 miles of a closure area. To identify these communities, a 20-mile buffer was drawn around areas that would be closed under Alternative 6 (Figure 3.8-1). A second buffer was drawn inland 5 miles from those areas of the coast that were touched by the first buffer. Communities within the intersection of these two buffers (that is, within 20 miles of an EFH closure area and within 5 miles of the coast) were identified as coastal communities with nearby Alternative 6 closure areas within the assumed range of a local small-boat fleet. While actual small-boat fleet ranges vary, and communities more than 5 miles inland could also be affected (meaning that a greater or lesser number of communities could be affected), these simplifications were used to derive an initial list of affected communities. Using this methodology, 26 communities were identified, including 25 contemporary civilian communities and the Coast Guard/military station at the historic community of Attu.

To establish a potential measure of gross, spatial-based, effects, maps were compiled by drawing a 20-mile radius around the identified communities to show the assumed range of locally based small vessels. The maximum available ocean area within this radius was calculated (area within the radius, minus existing Steller sea lion closures). Under actual conditions, some area less than the maximum would actually be available for fishing, due to factors such as bathymetric constraints. Within the total existing conditions maximum available ocean area, the area that would be closed under Alternative 6 was calculated, as well as the area that would remain open, along with the area that would be closed as a percentage of existing conditions maximum available area. As shown in Table 3.8-17, identified communities ranged from having well less than 1 percent to more than 98 percent of nearby waters closed under this alternative. Of the communities identified as having at-risk catcher vessel revenues under Alternative 6, St. George would have by far the largest percentage (97.1 percent) of nearby waters closed under this alternative. Five communities (Nelson Lagoon, St. George, Port Heiden, Nikolski, and Akhiok) would have more than 70 percent of the maximum available nearby waters closed, an additional four communities (Toksook Bay, Larsen Bay, Tununak, and Chenega Bay) would have between one-third and one-half of otherwise available nearby waters closed, and a further nine communities would have between 10 and 25 percent of nearby waters closed under this alternative.

In terms of actual consequences that could result from these closures, the existing conditions maximum available ocean area varies greatly between communities due to the geography of nearby land forms, with the result that percentage closed areas might not be the most important variable in determining overall spatial-related impacts. For example, a community located on a small island would have a great deal more ocean area available to it than a community along a coast with a concave geometry. As shown in the table, areas available in nearby waters range from more than 1,222 to 353 square miles. A 50 percent closure near a community with a large available area nearby, all things being equal, might leave enough waters within range of the community to support a local fleet, but the same might not be true for communities with a relatively small area accessible under existing conditions. Again, real world constraints would determine the utility of those waters for productive fishing. Table 3.8-18 provides this same type of closure information, but with communities grouped by region. As shown, communities in many different areas of Alaska would potentially be affected by nearby waters closures. Figure 3.8-1 graphically displays open and closed areas within 20 miles of identified communities. This figure also displays overall Alternative 6 closure areas in the same regions.

Of the potential existing conditions small-vessel fisheries affected by nearby waters closures, halibut is clearly the most important, and only a subset of the communities identified as potentially affected actively participate in the fishery. A multi-step method was used to identify communities with currently active small-vessel halibut fisheries, as well as the potential scale of effects. The first step was to search Alaska Commercial Fisheries Entry Commission (CFEC) permit records by community to define those communities with current (in 2001) resident halibut permit holders in the vessels less than 60 feet in length category. Unfortunately, this also includes fairly large vessels, but permit types are not broken down into smaller length increments. Communities that lack active resident permit holders were eliminated from the list of potentially affected communities. The 13 relevant communities with current halibut permit holders (less than 60-foot category) are Chignik Lagoon, False Pass, King Cove, Mekoryuk, Old Harbor, Pilot Point, Port Alexander, Port Lions, St. George, St. Paul, Toksook, Tununak, and Yakutat. Information on the number of permits held, permits fished, total pounds landed, and estimated gross earnings by community for 2001 is presented in Table 3.8-19. As shown, 210 halibut permits are held in these communities, and the number of permits held by residents of individual communities ranged from 1 to 43.

Estimating small-vessel harvest placed at risk under Alternative 6 is problematic. Such an analysis would be possible, in part, through extensive queries of AKFIN halibut harvest data on a vessel-by-vessel basis, but (even if successful) the fundamental difficulty in performing such queries is that much of the data are confidential and cannot be reported. In fact, CFEC harvest data are restricted due to confidentiality for several of the 13 relevant communities. If one were to add another set of criteria defining small vessels as those under 28 feet in length, for example, the confidentiality restrictions would make consistent evaluation of the potential effects on communities using vessel-by-vessel data impractical.

Three other sets of data with less problematic confidentiality restrictions provide information on the scale of potential effects on communities. First, the closed ocean surface area in specific statistical reporting areas within 20 nm of the affected communities was calculated, as was the percentage that each of these closures represents of the total surface area in the affected statistical area. This differs somewhat from the total nearby waters closed area data presented in earlier tables because it is broken down by statistical area. The list of affected statistical areas was extracted from the GIS mapping of the intersection of 20 nm ranges from communities with EFH Alternative 6 closure areas. The second set of data provided is halibut landings in ports from NMFS Restricted Access Management (RAM) program reports. Due to the halibut fishery being managed through an IFQ structure, these data are publicly available. They are, however, only available for that subset of the 13 relevant communities defined by RAM as ports (Chignik, King Cove, Old Harbor, Port Lions, St. George, St. Paul, and Yakutat). Finally, 2001 total halibut harvest data by statistical area from AKFIN are included. While these data are from statistical areas near the communities, however, the reported catch for these areas may be (and in some cases surely is) associated with vessels from more distant communities. These three types of data are summarized in Table 3.8-20 and discussed below.

The available data suggest that the small-vessel halibut fleet from several potentially affected communities would probably experience only slight effects from Alternative 6. For example, Old Harbor, Pilot Point, and Port Lions would all have nearby ocean areas closed under this alternative; however, no harvest was reported in the affected statistical areas in 2001. In the case of False Pass, two adjacent statistical areas within 20 nm of the community would be closed, in part, under Alternative 6. While approximately 40 percent of one of these statistical areas and nearly 20 percent of the other would be closed, only the statistical area with the 20 percent closure had reported harvest (about 14,000 pounds). Thus, small-vessel effects in False Pass appear slight and may be recovered in nearby open areas. A similar condition exists for King Cove where closure areas would range from less than 1 to more than 43 percent of the statistical areas within 20 nm of the community. King Cove is also a major port, with 69 vessel deliveries totaling 679,374 pounds in 2001. Less than 20,000 pounds (under 3 percent of the total) was, however, harvested in the affected statistical area. Thus, small-vessel effects in King Cove appear slight and might be recovered in nearby open areas.

Two statistical areas around Mekoryuk would be affected by EFH closures under Alternative 6. One of these would have just under 22 percent of its area closed, and the other would have nearly 60 percent of the area closed within 20 nm of the community. The total harvest in those statistical areas combined was, however, just over 6,000 pounds. Affected statistical areas around Tooksook Bay and Tunanak also accounted for just over 6,000 pounds of total harvest. Thus, based on 2001 data, small-vessel effects in the Mekoryuk, Toksook, and Tunanak area appear slight and might be recovered in adjacent open areas.

Closure areas around Yakutat would be limited to two statistical areas and relatively small percentages of each. Yakutat is a major halibut delivery port with more than a million pounds landed in 2001. However, just over 40,000 pounds was harvested from the two affected statistical areas. Thus, while some effects might accrue to the Yakutat small-vessel fleet component, they are likely to be slight.

In contrast to the communities that appear to have a very small localized harvest, several communities appear to have the potential for considerable small-vessel-related effects. In the Chignik area, three statistical areas would be affected by EFH Alternative 6 closures, with a range of 5 to almost 41 percent closed. The Port of Chignik received landings from 38 vessels in 2001, totaling 478,257 pounds. Harvest in the three affected statistical areas combined was almost 300,000 pounds, which is equivalent to a vast majority of the total landings in the port. Thus, it is possible that EFH Alternative 6 closures might have considerable impacts on small-vessel halibut fleet components in the Chignik area, but much of the affected catch would be taken by vessels from outside of the community. It could also mean that those outside vessels would choose to fish and land catch elsewhere due to the closures, which would have its own impacts on the community unrelated to the local small vessel fleet.

Port Alexander has four affected statistical areas within 20 nm, with less than 1 to nearly 55 percent of each statistical area closed within the 20 nm range. The total harvest for these statistical areas was just under 800,000 pounds with just over 700,000 pounds coming from the statistical area with a 55 percent closure. Thus, based on these 2001 data, it appears that considerable impacts could accrue to the Port Alexander small-vessel halibut fleet.

Similarly, St. Paul and St. George would have very large portions of nearby statistical areas closed by EFH Alternative 6. In fact, between approximately 43 and 93 percent of the three statistical areas around St. George would be closed. Given that the St. George harvests are spread among these statistical areas, considerable impacts on the St. George small-vessel halibut fleet would be likely under EFH Alternative 6. Similarly, the vast majority of harvest around St. Paul is caught in a statistical area that would have an 85 percent closure.

It is assumed that small-vessel subsistence activity would not be directly regulated or otherwise restricted by EFH closures under Alternative 6, but some indirect impacts to subsistence users might accrue through loss of joint production opportunities if vessels used for both commercial and subsistence purposes were affected (or if income derived from commercial fishing that otherwise would be used to facilitate subsistence production were unavailable). In 2003, NMFS began to issue subsistence halibut permits to residents of rural communities and to tribal members. As of June 18, 2003, 6,673 subsistence halibut registration certificates (SHARCs) were issued, and this count is continuously increasing. While it is impossible to estimate the joint production effects EFH Alternative 6 closures might have on subsistence users, Table 3.8-21 provides the count of SHARCs for each rural community identified as having EFH closures in nearby waters. As shown, 127 permits are held by residents of these communities, with individual communities ranging between 0 and 24 permits held locally.

C.3.9 Summary of Benefits and Costs Among Alternatives

Until a final alternative is selected and implemented, and the industry has an opportunity to adjust fishing patterns and behavior in accordance with the new regulations, it is unlikely that even the industry members themselves can fully anticipate the size and distribution of effects of the fishing impact minimization alternatives. However, the analyses presented above provide qualitative and, where possible, some quantitative estimates of the benefits and costs of the measures under consideration by the Council. For example, it was possible to make a monetary estimate of the gross revenues placed at risk under each alternative. While gross measures are not suggested here to be equivalent to, nor necessarily even good proxies for, net effects, they can be used to gain insights into the expected nature and likely distribution of impacts that may be expected to emerge from implementation of each of the competing alternatives. Lacking the data necessary to derive empirical net results, and with the legal and administrative obligation to use the best available quantitative and qualitative information to draw informed conclusions about the potential net national effects of adopting one or another of the proposed actions, the foregoing analysis makes a good-faith effort to meet these requirements. The relative differences in costs and benefits between the individual alternatives, to the degree that they could be meaningfully distinguished, are provided in a summary table (Table 3.9-1) for the principal cost and benefit categories treated in greater detail above for each alternative. The distributional impacts, in terms of gross revenue at risk by geographic area, FMP fishery, gear type, and target species are also presented across the different alternatives in a summary table (Table 3.9-2).

C.4 CONSISTENCY WITH OTHER APPLICABLE LAWS

This section summarizes the consistency of the proposed action and supporting analyses with the Initial Regulatory Flexibility Act and EO 12898.

C.4.1 Initial Regulatory Flexibility Analysis (IRFA)

The Regulatory Flexibility Act (RFA), first enacted in 1980, was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization frequently has a bearing on its ability to comply with a federal regulation. Major goals of the RFA are 1) to increase agency awareness and understanding of the impact of their regulations on small business, 2) to require that agencies communicate and explain their findings to the public, and 3) to encourage agencies to use flexibility and to provide regulatory relief to small entities.

The RFA emphasizes predicting significant adverse impacts on small entities as a group distinct from other entities and on the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. Except in the case when an agency can certify that there is no likelihood of a significant adverse impact on a substantial number of small entities, when an agency publishes a proposed rule, it must prepare and make available for public review an Initial Regulatory Flexibility Analysis (IRFA) that describes the impact of the proposed rule on small entities. When an agency publishes a final rule, it must prepare a Final Regulatory Flexibility Analysis (FRFA). Analysis requirements for the IRFA are described below in more detail. In the case of the issues and alternatives considered in this analysis (Amendments 55/55/8/5/5 to FMPs for BSAI groundfish, GOA groundfish, crab, scallops, and salmon), the Council will make recommendations for the preferred alternative[10], and, if approved by the Secretary, NMFS will develop proposed regulatory amendments to implement the Council's preferred alternative.

Many, but by no means all, of the directly regulated entities would be considered small entities under the RFA (Section 601(3)). To ensure a broad consideration of impacts and alternatives, an IRFA has been prepared pursuant to 5 USC 603, without first making the threshold determination of whether or not this proposed action would have a significant adverse economic impact on a substantial number of small entities. A definitive assessment of the impacts on small entities, however, is dependent on the specific alternative and options selected by the Council and, thus, cannot be conducted until after final action.

The IRFA must contain the following:

- A description of the reasons why action by the agency is being considered
- A succinct statement of the objectives of, and the legal basis for, the proposed rule
- A description of, and where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate)
- A description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record
- An identification, to the extent practicable, of all relevant federal rules that may duplicate, overlap or conflict with the proposed rule
- A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that would minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as the following:

    1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities
    2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities

[10] At its October meeting, the NPFMC identified a preliminary preferred alternative to facilitate public review and comment. It will take action to identify a final preferred alternative, based on review, comment, and subsequent analysis as the EIS/RIR/IRFA undergoes edits and revisions.

3. The use of performance rather than design standards
4. An exemption from coverage of the rule, or any part thereof, for such small entities

In determining the scope, or universe, of the entities to be considered in an IRFA, NMFS generally includes only those entities, both large and small, that are directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis. NMFS interprets the intent of the RFA to address negative economic impacts, not beneficial impacts, and, thus, such a focus exists in analyses that are designed to address RFA compliance.

C.4.1.1 Definition of a Small Entity

The RFA recognizes and defines three kinds of small entities: 1) small businesses, 2) small non-profit organizations, and 3) small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a small business as having the same meaning as a small business concern, which is defined under Section 3 of the Small Business Act (SBA). Small business or small business concern includes any firm that is independently owned and operated and not dominant in its field of operation. The SBA has further defined a small business concern as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the United States economy through payment of taxes or use of American products, materials or labor. A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the form is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the United States, including fish harvesting and fish processing businesses. A business involved in fish harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual receipts not in excess of $3.5 million for all its affiliated operations worldwide. A seafood processor is a small business if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business involved in both the harvesting and processing of seafood products is a small business if it meets the $3.5 million criterion for fish harvesting operations. Finally, a wholesale business servicing the fishing industry is a small businesses if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

Small organizations. The RFA defines small organizations as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

C.4.1.2 Reason for Considering the Proposed Action

The purpose of this action is to determine whether and how to amend the Council FMPs pursuant to section 307(a) of the Magnuson-Stevens Act. More specifically, the three-part purpose of this action is to analyze for each fishery a range of potential alternatives to 1) identify and describe EFH for managed species, 2) adopt an approach for identifying HAPC, and 3) identify measures to minimize to the extent practicable the adverse effects of fishing on EFH (see also EIS Chapter 1, Purpose and Need for Action).

C.4.1.3 Objectives of, and Legal Basis for, the Proposed Action

The description and identification of EFH and HAPCs would not in and of itself have any direct environmental and/or socioeconomic impacts. The requirement to minimize the adverse effects of fishing on EFH would, however, likely result in environmental and/or socioeconomic impacts. Therefore, the effects of these alternatives on small entities must be evaluated. The objective of the action is to minimize, to the extent practicable, adverse effects on EFH caused by fishing, per the EFH requirements of the Magnuson- Stevens Act section 303(a)(7) and the regulatory guidelines developed by NMFS in accordance with section 305(b)(1)(A).

C.4.1.4 Number and Description of Affected Small Entities

The entities that would be directly regulated by this action are those that operate vessels fishing for groundfish, halibut, crab, salmon, and scallops in federal EEZ waters off of Alaska. Although harvest and gross revenue information is confidential for individual vessels, T the numbers of groundfish fishing vessels that are believed to qualify as small entities (based on the less than $3.5 million in annual gross revenues) were estimated at 1,178 in 2000, and 1,047 in 2001 (Hiatt et al. 2002). For purposes of the IRFA, nearly all of the vessels targeting halibut, crab, and salmon may be assumed to be small entities, when considered individually. In 2001, there were 1,994 vessels (1,985 CVs and 9 CPs) Pacific halibut operators, 11,160 salmon operators, and 1,163 crab operators active in Alaska fisheries that are believed to meet the small entity gross revenue criterion. These totals beg the question of affiliation, which (if data were available to objectively evaluate business linkages and relationships) would likely reduce this number.

Based on the gross ex-vessel value from the entire scallop fishery and the numbers of vessels participating, it appears that the nine vessels involved in this fishery could, if taken individually, be considered small entities (ADF&G 2003). It is probable, however, that this overstates the number of small entities in the scallop fishery, because six of the nine vessel operators coordinate fishing effort, through means of membership in a cooperative, which under SBA rules, may make their collective earning the appropriate threshold criterion. In that case, the cooperative would not qualify as a small entity (nor would any one of its member operations) by definition (see Section C.2.1.4).

Many vessels, throughout the GOA and BSAI, participate in both federal and state-managed fisheries and gross revenue from all fisheries combined may exceed the $3.5 million threshold. The vessels that would be considered large entities were either affiliated (e.g., ownership of multiple vessels, fishing cooperative members) or were catcher-processors with total revenues exceeding $3.5 million annually from all their commercial activities combined. However, little is known about the ownership structure of the vessels in the fleet, so it is possible that this IRFA overestimates the number of small entities owing to ownership, contractual arrangement, or other formal affiliation mechanisms.

C.4.1.5 Recordkeeping and Reporting Requirements

These alternatives all involve complicated closures of fishing areas. As noted earlier, many of the measures to protect EFH from fishing impacts depend heavily on the strict regulation of the location of fishing activities targeting many of the target fisheries in Alaska. Traditional methods of monitoring compliance with fishing regulations do not fully meet NMFS' need to monitor fishing activities, especially as envisioned under the fishing impact minimization alternatives. An electronic VMS is generally acknowledged to be an essential component of monitoring and management for complicated geographic area fishing closures. Different alternatives require extension of the VMS requirement, and associated reporting requirements, to different classes of fishing vessels. VMS equipment costs about $2,000 per vessel, installation costs about $160, and transmission costs average $5 a day, although many vessels in the affected fisheries already have and use VMS.

C.4.1.6 Relevant Federal Rules that May Duplicate, Overlap, or Conflict with Proposed Action

This analysis did not uncover any existing federal rules that duplicate, overlap, or conflict with any of the actions proposed in the alternatives.

C.4.1.7 Description of Significant Alternatives

The alternatives eliminated from consideration for the minimization of fishing impacts on EFH are described in Section 2.4.3 of the EIS. The alternatives accepted by the Council for consideration in the EIS are described in detail in Section 2.3.3 of the EIS and are briefly described above in the RIR under Section 1.4.

- Alternative 1 is the no action alternative, under which no additional measures would be taken at this time to minimize the effects of fishing on EFH.
- Alternative 2 would amend the GOA Groundfish FMP to prohibit the use of bottom trawls for rockfish in 11 designated areas of the GOA slope (200 to 1,000 m), but allow vessels endorsed for trawl gear to fish for rockfish in these areas with fixed gear or pelagic trawl gear.
- Alternative 3 would amend the GOA Groundfish FMP to prohibit the use of bottom trawl gear for targeting GOA slope rockfish species on the upper slope area (200 to 1,000 m), but allow vessels endorsed for trawl gear to fish for slope rockfish with fixed gear or pelagic trawl gear.
- Alternative 4 would amend the GOA and the BSAI Groundfish FMPs to prohibit the use of bottom trawl gear in designated areas of the EBS, AI, and GOA. In the EBS only, bottom trawl gear used in the remaining open areas would be required to have disks/bobbins on trawl sweeps and footropes.
- Alternative 5A would amend the GOA and BSAI Groundfish FMPs to prohibit the use of bottom trawl gear in expanded designated areas of the EBS, AI, and GOA. In the EBS only, bottom trawl gear used in the remaining open areas would be required to have disks/bobbins on trawl sweeps and footropes.
- Alternative 5B would amend the GOA and BSAI Groundfish FMPs to prohibit the use of bottom trawl gear in designated areas of the EBS and GOA. In the AI there would be a combination of measures designed to reduce the effects of trawling on corals and sponges. Additionally, for the EBS only, bottom trawl gear used in the remaining areas open to trawling would be required to have disks/bobbins on trawl sweeps and footropes.
- Alternative 6 would amend the GOA and BSAI Groundfish FMPs, the Alaska Scallop FMP, the BSAI Crab FMP, and Pacific Halibut Act regulations to prohibit the use of all bottom tending gear (dredges, bottom trawls, pelagic trawls that contact the bottom, longlines, dinglebars and pots) within approximately 20 percent of the fishable waters (i.e., 20 percent of the waters shallower than

1,000 m) in the BSAI and GOA. For a more detailed treatment of each of these alternatives, options, and suboptions, refer to Section 4.3 of the EIS. The comprehensive socioeconomic analysis of all of the alternatives and options under consideration is provided in Section 3 this RIR.

By a simple enumeration, most firms operating in the fisheries directly regulated by the proposed action are assumed to be small entities, as this term is defined under RFA, given their expected annual gross revenues of less than $3.5 million. As noted above, an IRFA should contain "a description of any significant alternatives to the proposed rule that accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that would minimize any significant economic impact of the proposed rule on small entities." The RIR for this action analyzes potential economic impacts of the six alternatives. At present, none of the fishing impact minimization alternatives before the Council currently contains explicit provisions in regard to mitigating the potential adverse effects of the alternatives on small entities, with the possible exception of alternatives that explicitly prohibit GOA bottom trawling, but that simultaneously provide an opportunity for displaced vessels (virtually all of which are small) to change gear and continue to fish these EFH areas (i.e., Alternatives 2 and 3). This is a substantial (potential) accommodation, because it effectively waives the conflicting LLP gear endorsement requirement. As noted, however, the Council has not yet chosen a final preferred alternative, so this section of the IRFA cannot be definitively completed until it does so (i.e., it is possible that the final preferred alternative may contain provisions which are not, at present, explicitly reflected in any of the current proposals under review).

C.4.2 Executive Order 12898

Executive Order 12898 (Environmental Justice, 59 Fed. Reg. 7629) focuses on environmental justice, relative to minority and low-income populations. EPA defines environmental justice as the "fair treatment for people of all races, cultures, and incomes, regarding the development of environmental laws, regulations, and policies." This EO was spurred by the growing need to address the impacts of environmental pollution on particular segments of our society. EPA responded by developing an environmental justice strategy that focuses the agency's efforts to address these concerns. This strategy is also used by other federal agencies. To determine whether environmental justice concerns exist, the demographics of the affected area should be examined to decide whether minority populations and low-income populations are present. If they are, the agencies must determine whether implementation of the alternatives might cause disproportionately high and adverse human health or environmental effects on these populations. Environmental justice concerns typically embody pollution and other environmental health issues, but EPA has stated that addressing environmental justice concerns is consistent with NEPA. Thus, all federal agencies are required to identify and address these issues. NOAA environmental review procedures[11] state that, unlike NEPA, the trigger for analysis under EO 12898 is not limited to actions that are major or significant. Hence, federal agencies are mandated to identify and address, as appropriate, "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Detailed existing conditions demographic information relevant to environmental justice analysis for many of the affected communities is available elsewhere (Downs 2003), and the same source also provides an overview of environmental justice issues of concern for several of the relevant Alaska commercial fisheries. That information is not repeated here, but several areas of potential environmental justice concerns are summarized in this section. These are impacts to Alaska Native communities,

[11] NOAA *Environmental Review Procedures for Implementing the National Environmental Policy Act* (Issued 06/03/99)

impacts to minority populations specifically associated with the affected fishery sectors, CDQ program impacts, and subsistence impacts.

The two communities identified as potentially experiencing significant impacts under Alternative 5A, and each of the options under Alternative 5B, King Cove and Sand Point, may be considered Alaska Native communities. According to 2000 census data, both King Cove and Sand Point have Alaska Native pluralities within their overall populations (47 and 42 percent, respectively). If persons living in group quarters (most of whom are relatively short-term processing workers) are deducted from the population, however, both of these communities have Alaska Native majority populations; in King Cove, 75 percent of the total population is Alaska Native, and 66 percent in Sand Point is Alaska Native. To the extent that high and adverse effects are felt at the community level under either of these alternatives, these would trigger environmental justice concerns.

Among the communities identified as potentially experiencing significant impacts under Alternative 6, a number may be considered Alaska Native communities in terms of their contemporary populations. In addition to King Cove and Sand Point in the Aleutians East Borough, St. George and St. Paul in the Pribilof Islands are likely to experience significant adverse effects related to disruption of ongoing commercial fishing activities. Both St. George and St. Paul have strong Alaska Native majority populations; in St. George, 92 percent of the total population is Alaska Native, and in St. Paul, 86 percent is Alaska Native. To the extent that these communities would experience disproportionately high and adverse impacts under Alternative 6, there would be environmental justice concerns. Impacts to the Pribilof communities are unlikely to be high and adverse under any of the other alternatives.

Kodiak, which would be affected by adverse impacts to a number of different sectors under Alternative 6, has a contemporary population that is 10 percent Alaska Native. Other communities noted as potentially experiencing a higher level of effects than other communities are also largely non-Native (Homer's population is 5 percent Alaska Native, Petersburg's is 7 percent, and Sitka's is 19 percent). There is no indication that impacts experienced in these communities would disproportionately accrue to Alaska Native residents under any of the alternatives.

Area closures under Alternative 6 may also result in disproportionate high and adverse impacts to Alaska Native communities through exclusion or preclusion of local small vessel fleets from significant portions of potential fishing areas near the communities. Of the 17 civilian communities listed in Table 3.8-17 as having 10 percent or more of the potential fishing area within 20 miles of the community closed, all but 2 (Port Alexander and Cold Bay) have Alaska Native majority populations. All 10 communities having 23 percent or more of the potential fishing area within 20 miles of the community closed under Alternative 6 are Alaska Native communities. These closures would result in environmental justice concerns.

As detailed in a number of different sources (including Downs 2003), significant pockets of minority, but non-Alaska Native, populations are employed in the Alaska fishing industry and would be vulnerable to disproportionate impacts, if management actions were to result in significant loss of employment. The most obvious of these are the workforces at the major seafood processing plants in Alaska coastal communities. For example, according to industry data supplied on 2000 workforce demographics for five of the seven major groundfish shoreside plants in the Alaska Peninsula/Aleutian Islands region, a total combined reported processing (and administrative) workforce of 2,364 persons was classified as 22.5 percent white or non-minority and 77.5 percent minority. Reporting facilities ranged from having a three-quarters minority workforce to a more than 90 percent minority workforce. The group classified as Asian/Pacific Islander was the largest minority group in two-thirds of the plants in any region reporting detailed data, and the group classified as Hispanic was the largest minority group in the remaining third. Impacts to processor employment are unclear under Alternative 6, but any adverse impacts that did occur would accrue to minority populations. As detailed elsewhere (Downs 2003), availability of alternate employment for displaced employees from this workforce is more limited than for the general population for a number of reasons. Impacts to processors are likely to be insignificant for all other alternatives.

The CDQ region of western Alaska is a specific area of concern for environmental justice issues. The CDQ program was explicitly designed to foster fishery participation among, and to direct fishery benefits toward, minority populations (87 percent of total population in these villages consists of Alaska Native residents) and low-income populations in the economically underdeveloped communities in western Alaska (CDQ region existing conditions are discussed in greater detail elsewhere [Council website 2002]). To the extent that the CDQ program has achieved these objectives, negative impacts to the CDQ program and communities are essentially, by definition, environmental justice impacts. Impacts to the program, or at least some groups depending on specific investments in different industry sectors, may be significant under Alternative 6. Impacts to the program are likely to be insignificant under the other alternatives.

Subsistence impacts are also potential environmental justice issues, given the disproportionate involvement of Alaska Natives in subsistence activities. While this has been an issue of concern in other recent fishery management action analyses (e.g., the Steller sea lion SEIS and the groundfish SEIS), this is unlikely to be a significant issue for direct EFH management actions, based on the assumption that subsistence activities themselves would not be at risk, nor would subsistence resources decline under any of the alternatives. Indirect impacts could be possible through loss of joint production opportunities (where vessels and gear are used for both commercial and subsistence purposes) and/or loss of income that otherwise would be directed toward subsistence pursuits. These types of impacts might be possible under Alternative 6 for the relevant identified Alaska Native communities, but would be unlikely under any of the other alternatives.

Under Alternative 6, some beneficial impact to subsistence may occur through the reallocation of nearshore resources from commercial to subsistence activities, due to near-community closures that would exclude some commercial, but not subsistence, fishing activities. Available information does not allow a quantification of the degree to which commercial activities may be having an adverse impact on the subsistence take of relevant species in the proposed closure areas, under existing conditions. As a result, potential subsistence gains under this alternative, which may result from the elimination of any such adverse impact, cannot be quantified.

Field experience does suggest, however, that conflicts between existing commercial and subsistence resource use of relevant species are generally low level and infrequent, but that specific instances of localized adverse effects of relatively limited duration may occur from time to time. In general, eliminating some or all potential for these near-community conflicts would have a beneficial effect on subsistence resource use. Given the complex relationship between commercial and subsistence users in most affected communities (for example, the same individuals and vessels may be involved in both activities), however, it is unclear whether there would be a net positive benefit to the subsistence user attributable to the proposed action when all factors are considered.

Where potential resource use conflicts with commercial vessels from outside, rather than inside, the community are eliminated, it is more likely that localized subsistence impacts would be positive. In general, however, given the known structure of the relevant fisheries and the communities with proposed nearby closures, it is assumed that any such gains would be relatively slight.

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